SUNDRY NOTICES AND REPORTS ON WELLS - FORM 4

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5749 (09-2006)

Received
JUL 01 2016
ND Oil & Gas Division

Well File No.
23105

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

- ☐ Notice of Intent — Approximate Start Date
- ☑ Report of Work Done — Date Work Completed: December 11, 2012
- ☐ Notice of Intent to Begin a Workover Project that may Qualify for a Tax Exemption Pursuant to NDCC Section 57-51.1-03. — Approximate Start Date

- ☐ Drilling Prognosis
- ☐ Redrilling or Repair
- ☐ Casing or Liner
- ☐ Plug Well
- ☐ Supplemental History
- ☐ Temporarily Abandon
- ☐ Other clean out & swell
- ☐ Spill Report
- ☐ Shooting
- ☐ Acidizing
- ☐ Fracture Treatment
- ☑ Change Production Method
- ☐ Reclamation

Well Name and Number: LUNKER FEDERAL 2-33-4H

Footages	Qtr-Qtr	Section	Township	Range
250 F N L 1200 F W L	NWNW	33	152 N	91 W

Field	Pool	County
VAN HOOK	Bakken	Mountrail

24-HOUR PRODUCTION RATE

	Before		After	
Oil	384	Bbls	0	Bbls
Water	0	Bbls	0	Bbls
Gas	0	MCF	0	MCF

Name of Contractor(s): Magna Energy Service #19

Address	City	State	Zip Code
	Williston	ND	58801

DETAILS OF WORK

RIH with Weatherford 4.5" 13.5# composite BP and set @ 9,360'. POOH. RD WL and lubricator. Allowed gas to migrate and BWO. Pumped 15 BSW down hole. ND 7 1/16" MGV. Removed 4-1/2" hanger and protection sleeve. NU Class II BOPE. Function tested. Test good. MU TTS 3.7" convex 5 blade mill with offset tip, titan mud motor, XRV tool, circ sub, jars and BPV. Measured in hole with 288 jts 2-3/8" PH6 tbg stopping to fill and test mud motor every 50 jts. Circulating oil out of hole at report time

RIH from derrick and continued MIH pushing plug through lateral stopping to wash down as needed. Changed out washington head rubber and slip inserts to 2 7/8". Continued MIH with 2-7/8" PH6. Tagged hard @ 11,604'. Milled through sleeve #27 there (depth is 17' off). Started to encounter sand. Washed down to Sleeve #26 @ 11,923' and milled through. Milled sleeves 25, 24, 23, 22, 21, sending sweeps after each sleeve. Each sleeve took an average of 10 mins to mill through. Circ bottoms up at report time....

Company	Telephone Number
Slawson Exploration Co., Inc.	(303) 592-8880

Address		
1675 Broadway, #1600		
City	State	Zip Code
Denver	CO	80202

Signature	Printed Name
Raymond M. Gorka	Raymond M. Gorka
Title	Date
Environmental & Regulatory Analyst	June 22, 2016
Email Address	
rgorka@slawsoncompanies.com	

FOR STATE USE ONLY

☑ Received	☐ Approved
Date: 7/20/16	
By:	
Title:	

SECI_CWA308-0002

North Dakota Industrial Commission Follow-up Spill Report

API Number	Well File or Facility No.
33 - -	23105

Received
APR 18 2016
ND Oil & Gas Division

Operator	Telephone Number
Slawson Exploration Co., Inc.	303-592-8880

Address	City	State	Zip Code
1675 Broadway, #1600	Denver	CO	80202

Well Name and Number or Facility Name	Field
LUNKER FEDERAL 2-33-4H	VAN HOOK

Location of Well or Facility	Footages	Qtr-Qtr	Section	Township	Range	County
	F L F L	NWNW	33	152 N	91 W	Mountrail

Description of Spill Location if not on Well or Facility Site and/or Distance and Direction from Well or Facility
Mostly on location,68%; 30% to the north and a 2% to the SW.

Directions to Site

Release Discovered By	Date Release Discovered	Time Release Discovered	Date Release Controlled	Time Release Controlled
	December 12, 2012	3 : 30 PM	December 14, 2012	:

Company Personnel Notified	How Notified	Date Notified	Time Notified
		December 12, 2012	:

Type of Incident	Root Cause of Release	Date Clean up Activities Concluded
Blowout	Equipment Failure/Malfunction	June 18, 2013

Distance to Nearest Residence or Occupied Building	Distance to Nearest Fresh Water Well

Piping Specifics (If Applicable)	Size (Decimal Format)	Type	Location of Piping
	"		

Volume of Release	Oil	Saltwater	Other
	800.00 Barrels	400.00 Barrels	

Volume of Release Recovered	Oil	Saltwater	Other
	800.00 Barrels	400.00 Barrels	

Was Release Contained Within Dike	If No, Was Release Contained on Well Site	If No, Was Release Contained on Facility Site or Pipeline ROW
No	No	No

Areal Extent of Release if not Within Dike	Affected Medium	General Land Use
about 70 acres	Topsoil	Cultivated

Describe Cause of Release or Fire and Other Type of Incidents, Root Causes of Release, Land Uses, and Released Substances
During a workover on the well, 'cause it started "dieing" on the 1st, 2 things happened. 1. The wrong set of BOP's were in place, and 2. the elevators failed, sending the wellstring down the well, and with no way to shut the well in, the well came "alive" and blew out uncontrolably.

Action Taken to Control Release and Clean Up Action Undertaken
Wild Well Control was flown up there that night from Texas; Vacuum trucks were called in to clean up spilled oil & produced water. Once the well was under control with a BOP, cleanup began. Impacted soil was removed.

Potential Environmental Impacts
Spill did not reach any surface or groundwater receptors.

Planned Future Action and/or Action Taken to Prevent Reoccurrence
Changed operating procedure, Correct BOP's will Always BE USED.

Where Were Recovered Liquids Disposed	Where Were Recovered Solids Disposed
Clean Harbors	Clean Harbors

Weather Conditions	Wind Speed	Wind Direction	Temperature	Skies	Estimated Cleanup Cost	Damage Value
	MPH		° F		$	$

Regulatory Agencies/Others Notified	Person Notified	Date Notified	Time Notified	Notified By
NDIC/NDDH			:	
Fee Surface Owner		December 13, 2012	:	R. Gorka
Core of Engineers		December 13, 2012	:	R. Gorka
Federal Agency Lease Number				
BLM			:	
USFS			:	

Report Originator	Title	Date
Kay Gorka	Environmental/Regulatory Analyst	April 12, 2016

Signature	Date
	April 12, 2016

North Dakota Industrial Commission Follow-up Spill Report-Page 2

(Only to be used if additional space is needed)

Well File No.
23105

Well Name and Number or Facility Name			Field			
LUNKER FEDERAL 2-33-4H			VAN HOOK			
Location of Well or Facility		Qtr-Qtr	Section	Township	Range	County
		NWNW	33	152 N	91 W	Mountrail
Release Discovered By	Date Release Discovered	Time Release Discovered		Date Release Controlled		Time Release Controlled
0	December 12, 2012	3 : 30 PM		December 14, 2012		0 : 0 0

Description of Spill Location if not on Well or Facility Site and/or Distance and Direction from Well

Directions to Site

Describe Cause of Release or Fire and Other Type of Incidents, Root Causes of Release, Land Uses, and Released Substances

Cleanup was "over" when we did the prescribed burn. This was done on June 18, 2013. This satisfied the CORPS of Engineers to ensure all hydrocarbons were gone and would not enter the lake.

Action Taken to Control Release and Clean Up Action Undertaken

Potential Environmental Impacts

Planned Future Action and/or Action Taken to Prevent Reoccurrence

We have changed our well operations procedures, so this should never happen again. We were also on a task force with other operators to make sure we are all on board with the risks.

Where Were Recovered Liquids Disposed	Where Were Recovered Solids Disposed
Liquids went to our SWD.	**Clean Harbors disposal.**

North Dakota Industrial Commission Follow-up Spill Report

API Number	Received	Well File or Facility No.
33 - -	APR 18 2016	23105

Operator		Telephone Number
Slawson Exploration Co., Inc.	ND Oil & Gas Division	303-592-8880

Address	City	State	Zip Code
1675 Broadway, #1600	Denver	CO	80202

Well Name and Number or Facility Name	Field
LUNKER FEDERAL 2-33-4H	VAN HOOK

Location of Well or Facility	Footages	Qtr-Qtr	Section	Township	Range	County
	F L F L	NWNW	33	152 N	91 W	Mountrail

Description of Spill Location if not on Well or Facility Site and/or Distance and Direction from Well or Facility

Directions to Site

Release Discovered By	Date Release Discovered	Time Release Discovered	Date Release Controlled	Time Release Controlled
	December 23, 2014	:	December 23, 2014	:

Company Personnel Notified	How Notified	Date Notified	Time Notified
		December 23, 2014	:

Type of Incident	Root Cause of Release	Date Clean up Activities Concluded
Tank Leak	Human Error	December 24, 2014

Distance to Nearest Residence or Occupied Building	Distance to Nearest Fresh Water Well

Piping Specifics (If Applicable)	Size (Decimal Format)	Type	Location of Piping
	"		

Volume of Release	Oil	Saltwater	Other
	1.00 Barrels	20.00 Barrels	
Volume of Release Recovered	1.00 Barrels	20.00 Barrels	

Was Release Contained Within Dike	If No, Was Release Contained on Well Site	If No, Was Release Contained on Facility Site or Pipeline ROW
Yes		

Areal Extent of Release if not Within Dike	Affected Medium	General Land Use
	Well/Facility Soil	

Describe Cause of Release or Fire and Other Type of Incidents, Root Causes of Release, Land Uses, and Released Substances

Water hauler left valve open.

Action Taken to Control Release and Clean Up Action Undertaken

Shut valve, sucked up produced water and oil.

Potential Environmental Impacts

none.

Planned Future Action and/or Action Taken to Prevent Reoccurrence

Hire better drvers.....

Where Were Recovered Liquids Disposed	Where Were Recovered Solids Disposed
Our own SWD	Clean Harbors

Weather Conditions	Wind Speed	Wind Direction	Temperature	Skies	Estimated Cleanup Cost	Damage Value
	MPH		° F		$	$

Regulatory Agencies/Others Notified	Person Notified	Date Notified	Time Notified	Notified By
NDIC/NDDH			:	
Fee Surface Owner			:	
Core of Engineers			:	
Federal Agency Lease Number				
BLM			:	
USFS			:	

Report Originator	Title	Date
Kay Gorka	Environmental/Regulatory Analyst	April 12, 2016

Signature	Date
	April 12, 2016

NORTH DAKOTA
OIL AND GAS DIVISION

Oil and Gas Division

Lynn D. Helms - Director Bruce E. Hicks - Assistant Director
Department of Mineral Resources
Lynn D. Helms - Director
North Dakota Industrial Commission
www.dmr.nd.gov/oilgas/

March 8, 2016

SLAWSON EXPLORATION
ATTENTION: KHEM SUTHIWAN
1675 BROADWAY STE 1600
DENVER, CO 80202

RE: See attached list of 41 wells

Dear Khem Suthiwan:

A Sundry notice (Form 4) is needed for the attached referenced wells, detailing the changeover.

43-02-03-31

Upon the installation of pumping equipment on a flowing well, or change in type of pumping equipment designed to increase productivity in a well, the operator shall submit a sundry notice (Form 4) of such installation. The notice shall include all pertinent information on the pump and the operation thereof including the date of such installation, and the daily production of the well prior to and after the pump has been installed

If you have any questions, feel free to contact our office.

Sincerely,

Robert Garbe

Robert Garbe
Minot District Supervisor

RKG/MAB/RLR

Oil and Gas Division

Lynn D. Helms - Director Bruce E. Hicks - Assistant Director

Department of Mineral Resources

Lynn D. Helms - Director

North Dakota Industrial Commission

www.dmr.nd.gov/oilgas/

PAYARA 1-21H
NENW 21-152N-91W
MOUNTRAIL COUNTY
WELL FILE NO: 17336

BANDIT 1-29H
NENE 29-152N-91W
MOUNTRAIL COUNTY
WELL FILE NO: 17459

WOLF 1-4H
SESE 4-151N-92W
MOUNTRAIL COUNTY
WELL FILE NO: 17505

MAMBA 1-20H
SWSE 20-152N-91W
MOUNTRAIL COUNTY
WELL FILE NO: 17567

VOYAGER 2-28H
NENE 33-152N-91W
MOUNTRAIL COUNTY
WELL FILE NO: 18495

LUNKER FEDERAL 1-33-4H
NENE 33-152N-91W
MOUNTRAIL COUNTY
WELL FILE NO: 18499

CRUSADER 1-16H
NWNE 21-151N-92W
MOUNTRAIL COUNTY
WELL FILE NO: 18619

MUSTANG 1-22H
SWSE 22-151N-92W
MOUNTRAIL COUNTY
WELL FILE NO: 18872

PHOENIX 1-18H
NENE 19-152N-91W
MOUNTRAIL COUNTY
WELL FILE NO: 18925

ARMADA FEDERAL 1-14-13H
SWSW 14-151N-92W
MOUNTRAIL COUNTY
WELL FILE NO: 19010

PERISCOPE FEDERAL 1-10-11-12H
SWSE 10-151N-92W
MOUNTRAIL COUNTY
WELL FILE NO: 19155

SUBMARINER FEDERAL 1-23-24H
NWNW 23-151N-92W
MOUNTRAIL COUNTY
WELL FILE NO: 19368

LOON FEDERAL 1-24-25H
NWNE 24-152N-92W
MOUNTRAIL COUNTY
WELL FILE NO: 19485

GENESIS 2-13H
NWNE 24-152N-92W
MOUNTRAIL COUNTY
WELL FILE NO: 19486

NEPTUNE 2-15H
NENE 15-151N-92W
MOUNTRAIL COUNTY
WELL FILE NO: 20154

WIZARD 2-35H
NENE 35-152N-93W
MOUNTRAIL COUNTY
WELL FILE NO: 20228

Oil and Gas Division

Lynn D. Helms - Director Bruce E. Hicks - Assistant Director

Department of Mineral Resources

Lynn D. Helms - Director

North Dakota Industrial Commission

www.dmr.nd.gov/oilgas/

JUGHEAD FEDERAL 2-26H
NENE 35-152N-93W
MOUNTRAIL COUNTY
WELL FILE NO: 20229

MUSTANG 2-22H
NWNW 22-151N-92W
MOUNTRAIL COUNTY
WELL FILE NO: 20721

FOX 2-28H
SWSE 21-152N-92W
MOUNTRAIL COUNTY
WELL FILE NO: 20855

REVOLVER 2-35H
SWSE 35-151N-92W
MOUNTRAIL COUNTY
WELL FILE NO: 22340

FOX 3-28H
SWSE 21-152N-92W
MOUNTRAIL COUNTY
WELL FILE NO: 23199

SERPENT (FEDERAL) 4-36-31TFH
SESE 35-151N-92W
MOUNTRAIL COUNTY
WELL FILE NO: 24771

BANDIT 3-29H
NENW 29-152N-91W
MOUNTRAIL COUNTY
WELL FILE NO: 25317

VOYAGER 3-28H
SWSE 21-152N-91W
MOUNTRAIL COUNTY
WELL FILE NO: 25547

DIAMONDBACK 2-21H
NWNW 21-151N-92W
MOUNTRAIL COUNTY
WELL FILE NO: 20346

ZULU 2-21H
SWSE 21-152N-92W
MOUNTRAIL COUNTY
WELL FILE NO: 20854

SERPENT FEDERAL 1-36-31H
SENE 35-151N-92W
MOUNTRAIL COUNTY
WELL FILE NO: 21570

LUNKER FEDERAL 2-33-4H
NWNW 33-152N-91W
MOUNTRAIL COUNTY
WELL FILE NO: 23105

SERPENT FEDERAL 2-36-31H
SESE 35-151N-92W
MOUNTRAIL COUNTY
WELL FILE NO: 24514

MAMBA 3-20H
NENW 29-152N-91W
MOUNTRAIL COUNTY
WELL FILE NO: 25316

PAYARA 3-21H
SWSE 21-152N-91W
MOUNTRAIL COUNTY
WELL FILE NO: 25546

DIAMONDBACK 3-21H
SESW 16-151N-92W
MOUNTRAIL COUNTY
WELL FILE NO: 25823

NORTH DAKOTA
OIL AND GAS DIVISION

Oil and Gas Division

Lynn D. Helms - Director Bruce E. Hicks - Assistant Director
Department of Mineral Resources
Lynn D. Helms - Director
North Dakota Industrial Commission
www.dmr.nd.gov/oilgas/

MINX 3-29H
NENW 29-152N-92W
MOUNTRAIL COUNTY
WELL FILE NO: 26441

ZULU 5-21H
SWSE 21-152N-92W
MOUNTRAIL COUNTY
WELL FILE NO: 26991

CRUISER 3-16-9H
SESW 16-151N-92W
MOUNTRAIL COUNTY
WELL FILE NO: 27274

CRUISER 7-16-9TFH
NENE 21-151N-92W
MOUNTRAIL COUNTY
WELL FILE NO: 27877

REVOLVER 7-35TFH
SWSE 35-151N-92W
MOUNTRAIL COUNTY
WELL FILE NO: 29144

BAZOOKA 3-20H
NENW 29-152N-92W
MOUNTRAIL COUNTY
WELL FILE NO: 26442

FOX 5-28H
SWSE 21-152N-92W
MOUNTRAIL COUNTY
WELL FILE NO: 26992

CRUISER 6-16-9TFH
NWNE 21-151N-92W
MOUNTRAIL COUNTY
WELL FILE NO: 27876

ZULU 6-21TFH
SWSE 21-152N-92W
MOUNTRAIL COUNTY
WELL FILE NO: 28208

SUNDRY NOTICES AND REPORTS ON WELLS - FORM 4

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5749 (09-2006)

FEB 2015
RECEIVED
ND OIL & GAS
DIVISION

Well File No.
23105

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

☐ Notice of Intent	Approximate Start Date	☐ Drilling Prognosis	☐ Spill Report
☑ Report of Work Done	Date Work Completed: **October 29, 2014**	☐ Redrilling or Repair	☐ Shooting
☐ Notice of Intent to Begin a Workover Project that may Qualify for a Tax Exemption Pursuant to NDCC Section 57-51.1-03.	Approximate Start Date	☐ Casing or Liner	☐ Acidizing
		☐ Plug Well	☐ Fracture Treatment
		☐ Supplemental History	☐ Change Production Method
		☐ Temporarily Abandon	☐ Reclamation
		☑ Other **LACT meter removed**	

Well Name and Number					
Lunker Federal 2-33-4H					
Footages	Qtr-Qtr	Section	Township	Range	
250 F N L 1200 F WL	**NWNW**	**33**	**152 N**	**91 W**	
Field	Pool	County			
Van Hook	**Bakken**	**Mountrail**			

24-HOUR PRODUCTION RATE

Before		After	
Oil	Bbls	Oil	Bbls
Water	Bbls	Water	Bbls
Gas	MCF	Gas	MCF

Name of Contractor(s)			
Address	City	State	Zip Code

DETAILS OF WORK

The LACT meter was removed from the referenced well on 10/29/2014. The LACT was moved to another location.

Company: **Slawson Exploration Company, Inc.**		Telephone Number: **(303) 625-9707**
Address: **1675 Broadway, Suite 1600**		
City: **Denver**	State: **CO**	Zip Code: **80202**
Signature	Printed Name: **Sydney H. Taylor**	
Title: **Regulatory Analyst**	Date: **December 19, 2014**	
Email Address: **staylor@slawsoncompanies.com**		

FOR STATE USE ONLY

☐ Received	☒ Approved
Date: 2-3-2015	
By: David Tabor	
Title: **PETROLEUM ENGINEER**	

Industrial Commission of North Dakota
Oil and Gas Division
Spill / Incident Report

Date/Time Reported : Dec 23 2014 / 11:50
State Agency person :
Responsible Party : SLAWSON EXPLORATION COMPANY, INC.
Well Operator : SLAWSON EXPLORATION COMPANY, INC.
Date/Time of Incident : 12/23/2014 12:00:00 AM
NDIC File Number : 23105
Facility Number :
Well or Facility Name : LUNKER FEDERAL 2-33-4H
Type of Incident : Valve/Piping Connection Leak
Field Name : VAN HOOK
County : MOUNTRAIL
Section : 33
Township : 152
Range : 91
Quarter-Quarter : NW
Quarter : NW
Distance to nearest residence : 3050 Feet
Distance to nearest water well : 3050 Feet
Release Oil : 1 Barrels
Release Brine : 20 Barrels
Release Other :
Recovered Oil : 1 Barrels
Recovered Brine : 19.5 Barrels
Recovered Other :
Has/Will the incident be reported to the NRC? : No
Was release contained : Yes - Within Dike
Description of other released substance :

Immediate risk evaluation : none....
Followup Report Requested Y/N : Y

SUNDRY NOTICES AND REPORTS ON WELLS - FORM 4

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5749 (09-2006)

RECEIVED
JAN 2014
ND OIL & GAS DIVISION

Well File No.
23105

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

☐ Notice of Intent	Approximate Start Date	☐ Drilling Prognosis	☐ Spill Report
☑ Report of Work Done	Date Work Completed: June 4, 2013	☐ Redrilling or Repair	☐ Shooting
☐ Notice of Intent to Begin a Workover Project that may Qualify for a Tax Exemption Pursuant to NDCC Section 57-51.1-03.	Approximate Start Date	☐ Casing or Liner	☐ Acidizing
		☐ Plug Well	☐ Fracture Treatment
		☐ Supplemental History	☐ Change Production Method
		☐ Temporarily Abandon	☐ Reclamation
		☑ Other	LACT meter install

Well Name and Number					
Lunker Federal 2-33-4H					
Footages	Qtr-Qtr	Section	Township	Range	
250 F N L 1200 F WL	NWNW	33	152 N	91 W	
Field	Pool	County			
Van Hook	Bakken	Mountrail			

24-HOUR PRODUCTION RATE

Before		After	
Oil	Bbls	Oil	Bbls
Water	Bbls	Water	Bbls
Gas	MCF	Gas	MCF

Name of Contractor(s)			
Address	City	State	Zip Code

DETAILS OF WORK

A LACT meter was installed on the referenced well on 6/4/2013.

DETAILS
Meter number: FC0B8B16000
Make/model: Promass F
Meter size: 2"

Company: Slawson Exploration Company, Inc.			Telephone Number: (303) 625-9707
Address: 1675 Broadway, Suite 1600			
City: Denver	State: CO	Zip Code: 80202	
Signature: Sydney H. Jackson	Printed Name: Sydney H. Jackson		
Title: Regulatory Analyst	Date: January 24, 2014		
Email Address: sjackson@slawsoncompanies.com			

FOR STATE USE ONLY

☐ Received	☑ Approved
Date: 3-26-2014	
By: David Tabor	
Title: PETROLEUM ENGINEER	

Industrial Commission of North Dakota
Oil and Gas Division
Spill / Incident Report

Date/Time Reported : Dec 13 2012 / 10:19
State Agency person :
Responsible Party : Slawson Exploration Co., Inc.
Well Operator : SLAWSON EXPLORATION COMPANY, INC.
Date/Time of Incident : 12/12/2012 12:00:00 AM
NDIC File Number : 23105
Facility Number :
Well or Facility Name : LUNKER FEDERAL 2-33-4H
Type of Incident : Blowout
Field Name : VAN HOOK
County : MOUNTRAIL
Section : 33
Township : 152
Range : 91
Quarter-Quarter : NW
Quarter : NW
Distance to nearest residence : 3100 Feet
Distance to nearest water well : 1900 Feet
Release Oil : 800 barrels
Release Brine : 400 barrels
Release Other : 0 barrels
Recovered Oil : 0 barrels
Recovered Brine : 0 barrels
Recovered Other : 0 barrels
Has/Will the incident be reported to the NRC? : No
Was release contained : Yes - On Constructed Well Site
Description of other released substance :

Immediate risk evaluation : Explosive, yes...
Followup Report Requested Y/N : Y

AUTHORIZATION TO PURCHASE AND TRANSPORT OIL FROM LEASE - FORM 8

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5698 (03-2000)

RECEIVED
MAR 2013
ND OIL & GAS DIVISION

Well File No. 23105
NDIC CTB No. 23105

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND FOUR COPIES.

Well Name and Number	Qtr-Qtr	Section	Township	Range	County
Lunker Federal #2-33-4H	NWNW	33	152 N	91 W	Mountrail

Operator	Telephone Number	Field
Slawson Exploration Company, Inc.	720-897-8762	Van Hook

Address	City	State	Zip Code
1675 Broadway, Suite 1600	Denver	CO	80202

Name of First Purchaser	Telephone Number	% Purchased	Date Effective
Inland Crude Purchasing, LLC	720-961-4053	100	January 1, 2013

Principal Place of Business	City	State	Zip Code
1675 Broadway, Suite 1600	Denver	CO	80202

Field Address	City	State	Zip Code

Name of Transporter	Telephone Number	% Transported	Date Effective
Pelican Gathering Systems, LLC	720-897-8757	50	January 1, 2013

Address	City	State	Zip Code
1675 Broadway, Suite 1600	Denver	CO	80202

The above named producer authorizes the above named purchaser to purchase the percentage of oil stated above which is produced from the lease designated above until further notice. The oil will be transported by the above named transporter.

Other First Purchasers Purchasing From This Lease	% Purchased	Date Effective

Other First Purchasers Purchasing From This Lease	% Purchased	Date Effective

Other Transporters Transporting From This Lease	% Transported	Date Effective
Wolf Oil Field Services LLC	50	approx. 1/1/13

Other Transporters Transporting From This Lease	% Transported	Date Effective

Comments
Revised Form due to issue with pump requiring us to truck some of the bbls off the well.

I hereby swear or affirm that the information provided is true, complete and correct as determined from all available records. Date: February 27, 2013

Signature	Printed Name	Title
Stacy Leyshon	Stacy Leyshon	Marketing Analyst

Above Signature Witnessed By

Witness Signature	Witness Printed Name	Witness Title
	Matt Glenn	Engineering Technician

FOR STATE USE ONLY

Date Approved	MAR 05 2013
By	Erin Peterson
Title	Oil & Gas Production Analyst

AUTHORIZATION TO PURCHASE AND TRANSPORT OIL FROM LEASE - FORM 8

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5698 (03-2000)

RECEIVED
MAR 2013
ND OIL & GAS DIVISION

Well File No.
23105
NDIC CTB No.
123105

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND FOUR COPIES.

Well Name and Number	Qtr-Qtr	Section	Township	Range	County
Lunker Federal #2-33-4H	NWNW	33	152 N	91 W	Mountrail

Operator	Telephone Number	Field
Slawson Exploration Company, Inc.	720-897-8762	Van Hook

Address	City	State	Zip Code
1675 Broadway, Suite 1600	Denver	CO	80202

Name of First Purchaser	Telephone Number	% Purchased	Date Effective
Inland Crude Purchasing, LLC	720-961-4053	100	January 1, 2013

Principal Place of Business	City	State	Zip Code
1675 Broadway, Suite 1600	Denver	CO	80202

Field Address	City	State	Zip Code

Name of Transporter	Telephone Number	% Transported	Date Effective
Pelican Gathering Systems, LLC	720-897-8757	80	February 1, 2013

Address	City	State	Zip Code
1675 Broadway, Suite 1600	Denver	CO	80202

The above named producer authorizes the above named purchaser to purchase the percentage of oil stated above which is produced from the lease designated above until further notice. The oil will be transported by the above named transporter.

Other First Purchasers Purchasing From This Lease	% Purchased	Date Effective

Other First Purchasers Purchasing From This Lease	% Purchased	Date Effective

Other Transporters Transporting From This Lease	% Transported	Date Effective
Wolf Oil Field Services	20	February 1, 2013

Other Transporters Transporting From This Lease	% Transported	Date Effective

Comments
Some bbls are still being trucked off of the well in addition to going into the pipeline.

I hereby swear or affirm that the information provided is true, complete and correct as determined from all available records. Date: February 27, 2013

Signature	Printed Name	Title
Stacy Leyshon	Stacy Leyshon	Marketing Analyst

Above Signature Witnessed By

Witness Signature	Witness Printed Name	Witness Title
Matt Glenn	Matt Glenn	Engineering Technician

FOR STATE USE ONLY

Date Approved	MAR 05 2013
By	Evie Roberson
Title	Oil & Gas Production Analyst

AUTHORIZATION TO PURCHASE AND TRANSPORT OIL FROM LEASE - FORM 8

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5698 (03-2000)

RECEIVED
JAN 2013
ND OIL & GAS DIVISION

Well File No.	
23105	
NDIC CTB No.	
123105	

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND FOUR COPIES.

Well Name and Number	Qtr-Qtr	Section	Township	Range	County
Lunker Federal #2-33-4H	NWNW	33	152 N	91 W	Mountrail

Operator	Telephone Number	Field
Slawson Exploration Company, Inc.	720-897-8762	Van Hook

Address	City	State	Zip Code
1675 Broadway, Suite 1600	Denver	CO	80202

Name of First Purchaser	Telephone Number	% Purchased	Date Effective
Inland Crude Purchasing, LLC	720-961-4053	100	approx. 1/8/2013

Principal Place of Business	City	State	Zip Code
1675 Broadway, Suite 1600	Denver	CO	80202

Field Address	City	State	Zip Code

Name of Transporter	Telephone Number	% Transported	Date Effective
Pelican Gathering Systems, LLC	720-897-8757	100	approx. 1/8/2013

Address	City	State	Zip Code
1675 Broadway, Suite 1600	Denver	CO	80202

The above named producer authorizes the above named purchaser to purchase the percentage of oil stated above which is produced from the lease designated above until further notice. The oil will be transported by the above named transporter.

Other First Purchasers Purchasing From This Lease	% Purchased	Date Effective
Other First Purchasers Purchasing From This Lease	% Purchased	Date Effective
Other Transporters Transporting From This Lease	% Transported	Date Effective
Other Transporters Transporting From This Lease	% Transported	Date Effective

Comments
Change of purchaser from Eighty-Eight Oil to Inland Crude Purchasing, and change of transporter from Bridger PL to Pelican Gathering Systems, LLC effective approx 1/8/13.

I hereby swear or affirm that the information provided is true, complete and correct as determined from all available records. Date: January 4, 2013

Signature	Printed Name	Title
	Stacy Leyshon	Marketing Analyst

Above Signature Witnessed By

Witness Signature	Witness Printed Name	Witness Title
	Matt Glenn	Engineering Technician

FOR STATE USE ONLY

Date Approved	FEB 6 2013
By	Evie Peterson
Title	Oil & Gas Production Analyst

AUTHORIZATION TO PURCHASE AND TRANSPORT OIL FROM LEASE - FORM 8

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5698 (03-2000)

JAN 2013
RECEIVED
ND OIL & GAS DIVISION

Well File No.
23105
NDIC CTB No.
123105

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND FOUR COPIES.

Well Name and Number	Qtr-Qtr	Section	Township	Range	County
Lunker Federal #2-33-4H	NWNW	33	152 N	91 W	Mountrail

Operator	Telephone Number	Field
Slawson Exploration Company, Inc.	720-897-8762	Van Hook

Address	City	State	Zip Code
1675 Broadway, Suite 1600	Denver	CO	80202

Name of First Purchaser	Telephone Number	% Purchased	Date Effective
Inland Crude Purchasing, LLC	720-961-4053	90	January 1, 2013

Principal Place of Business	City	State	Zip Code
1675 Broadway, Suite 1600	Denver	CO	80202
Field Address	City	State	Zip Code

Name of Transporter	Telephone Number	% Transported	Date Effective
Pelican Gathering Systems, LLC	720-897-8757	90	January 1, 2013

Address	City	State	Zip Code
1675 Broadway, Suite 1600	Denver	CO	80202

The above named producer authorizes the above named purchaser to purchase the percentage of oil stated above which is produced from the lease designated above until further notice. The oil will be transported by the above named transporter.

Other First Purchasers Purchasing From This Lease	% Purchased	Date Effective
UET Shipping, LLC	10	January 1, 2013
Other First Purchasers Purchasing From This Lease	% Purchased	Date Effective
Other Transporters Transporting From This Lease	% Transported	Date Effective
Wolf Oil Field Services	10	January 1, 2013
Other Transporters Transporting From This Lease	% Transported	Date Effective

Comments
Added additional first purchaser and transporter.

I hereby swear or affirm that the information provided is true, complete and correct as determined from all available records. Date: January 7, 2013

Signature	Printed Name	Title
Stacy Leyshon	Stacy Leyshon	Marketing Analyst

Above Signature Witnessed By

Witness Signature	Witness Printed Name	Witness Title
Matt Glenn	Matt Glenn	Engineering Technician

FOR STATE USE ONLY

Date Approved	JAN 10 2013
By	
Title	Oil & Gas Production Analyst

SECI_CWA308-0017

WELL COMPLETION OR RECOMPLETION REPORT - FORM 6

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 2468 (04-2010)

RECEIVED
NOV 2012
ND OIL & GAS DIVISION

Well File No. 23105

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

Designate Type of Completion
☑ Oil Well ☐ EOR Well ☐ Recompletion ☐ Deepened Well ☐ Added Horizontal Leg ☐ Extended Horizontal Leg
☐ Gas Well ☐ SWD Well ☐ Water Supply Well ☐ Other:

Well Name and Number		Spacing Unit Description
LUNKER FEDERAL 2-33-4H		S33 T152 R91 & S4 T151 R91
Operator	Telephone Number	Field
Slawson Exploration Company, Inc.	720-457-9820	VAN HOOK
Address		Pool
1675 Broadway Suite 1600		Bakken
City / State / Zip Code		Permit Type
Denver / CO / 80202		☐ Wildcat ☑ Development ☐ Extension

LOCATION OF WELL

At Surface	Qtr-Qtr	Section	Township	Range	County
250 F N L 1200 F W L	NWNW	33	152 N	91 W	Mountrail

Spud Date	Date TD Reached	Drilling Contractor and Rig Number	KB Elevation (Ft)	Graded Elevation (Ft)
1/0/1900	9/15/2012	Cyclone #27	1898	1875

Type of Electric and Other Logs Run (See Instructions)
OH Log Waiver - CBL w/ GR and CCL from KOP to 100' above the TOC & GR to surface

CASING & TUBULARS RECORD (Report all strings set in well)

Well Bore	String Type	String Size (Inch)	Top Set (MD Ft)	Depth Set (MD Ft)	Hole Size (Inch)	Weight (Lbs/Ft)	Anchor Set (MD Ft)	Packer Set (MD Ft)	Sacks Cement	Top of Cement
Surface Hole	Surface	9 5/8	0	1779	13 1/2	36			505	
Vertical Hole	Intermediate	7	0	10042	8 3/4	29 & 32			950	
Lateral1	Liner	4 1/2	9145	19530	6	11.6		9145		

PERFORATION & OPEN HOLE INTERVALS

Well Bore	Well Bore TD Drillers Depth (MD Ft)	Completion Type	Open Hole/Perforated Interval (MD,Ft) Top	Bottom	Kick-off Point (MD Ft)	Top of Casing Window (MD Ft)	Date Perf'd or Drilled	Date Isolated	Isolation Method	Sacks Cement
Lateral1	19536	Other	10042	19530	9234	10042	9/15/2012	9/18/2012	PKR	

PRODUCTION

Current Producing Open Hole or Perforated Interval(s), This Completion, Top and Bottom, (MD Ft)							Name of Zone (If Different from Pool Name)	
10042' to 19530'							Middle Bakken	
Date Well Completed (SEE INSTRUCTIONS)		Producing Method		Pumping-Size & Type of Pump			Well Status (Producing or Shut-In)	
10/11/2012		Flowing					Producing up a 7" Casing	
Date of Test	Hours Tested	Choke Size	Production for Test	Oil (Bbls)	Gas (MCF)	Water (Bbls)	Oil Gravity-API (Corr.)	Disposition of Gas
10/25/2012	24	26 /64		778	497.92	443	42.0 °	Flared
Flowing Tubing Pressure (PSI)	Flowing Casing Pressure (PSI)		Calculated 24-Hour Rate	Oil (Bbls)	Gas (MCF)	Water (Bbls)	Gas-Oil Ratio	
	700			778	497.92	443	640	

GEOLOGICAL MARKERS

Formation	MD (Ft)	TVD (Ft)
Greenhorn	3934	
Belle Fourche	4097	
Mowry	7310	
Inyan Kara	7636	
Swift	5100	
Rierdon	5458	
Piper	5552	
Dunham Salt	5960	
Base Dunham Salt	6040	
Spearfish	6056	
Pine Salt	6280	
Base Pine Sale	6337	
Opeche	6376	
Minnelusa	6618	
Amsden	6798	
Tyler	6940	
Big Snowy	7133	
Kibbey	7280	
Kibbey Lime	7419	
Charles	7575	
Base Last Salt	8054	
Mission Canyon	8236	
Lodgepole	8836	
KOP	9234	
Upper Bakken Shale	9646	
Middle Bakken	9666	
Middle Bakken Mkr	9677	

PLUG BACK INFORMATION

Well Bore	Type of Plug	Top (Ft)	Bottom (Ft)	Sacks Cement

CORES CUT

Top (Ft)	Bottom (Ft)	Formation	Top (Ft)	Bottom (Ft)	Formation

Drill Stem Test

Test Date	Formation	Top (Ft)	Bottom (Ft)	BH Temp (°F)	CL ppm	H2S ppm	Shut-in 1 (PSIG)	Shut-in 2 (PSIG)

Drill Pipe Recovery

Sample Chamber Recovery

Test Date	Formation	Top (Ft)	Bottom (Ft)	BH Temp (°F)	CL ppm	H2S ppm	Shut-in 1 (PSIG)	Shut-in 2 (PSIG)

Drill Pipe Recovery

Sample Chamber Recovery

Test Date	Formation	Top (Ft)	Bottom (Ft)	BH Temp (°F)	CL ppm	H2S ppm	Shut-in 1 (PSIG)	Shut-in 2 (PSIG)

Drill Pipe Recovery

Sample Chamber Recovery

Test Date	Formation	Top (Ft)	Bottom (Ft)	BH Temp (°F)	CL ppm	H2S ppm	Shut-in 1 (PSIG)	Shut-in 2 (PSIG)

Drill Pipe Recovery

Sample Chamber Recovery

Test Date	Formation	Top (Ft)	Bottom (Ft)	BH Temp (°F)	CL ppm	H2S ppm	Shut-in 1 (PSIG)	Shut-in 2 (PSIG)

Drill Pipe Recovery

Sample Chamber Recovery

Well Specific Stimulations

Date Stimulated	Stimulated Formation	Top (Ft)	Bottom (Ft)	Stimulation Stages	Volume	Volume Units
10/2/2012	Middle Bakken	10042	19530	32	40591	Barrels

Type Treatment	Acid %	Lbs Proppant	Maximum Treatment Pressure (PSI)	Maximum Treatment Rate (BBLS/Min)
Sand Frac		3101667	5945	33.6

Details
Fractured the Middle Bakken with 32, stages using fracturing sleeves and packers, with 312080# of 100 Mesh Sand, 2789587# of 20/40 White Sand, and 40591 bbls of clean water.

Date Stimulated	Stimulated Formation	Top (Ft)	Bottom (Ft)	Stimulation Stages	Volume	Volume Units

Type Treatment	Acid %	Lbs Proppant	Maximum Treatment Pressure (PSI)	Maximum Treatment Rate (BBLS/Min)

Details

Date Stimulated	Stimulated Formation	Top (Ft)	Bottom (Ft)	Stimulation Stages	Volume	Volume Units

Type Treatment	Acid %	Lbs Proppant	Maximum Treatment Pressure (PSI)	Maximum Treatment Rate (BBLS/Min)

Details

Date Stimulated	Stimulated Formation	Top (Ft)	Bottom (Ft)	Stimulation Stages	Volume	Volume Units

Type Treatment	Acid %	Lbs Proppant	Maximum Treatment Pressure (PSI)	Maximum Treatment Rate (BBLS/Min)

Details

Date Stimulated	Stimulated Formation	Top (Ft)	Bottom (Ft)	Stimulation Stages	Volume	Volume Units

Type Treatment	Acid %	Lbs Proppant	Maximum Treatment Pressure (PSI)	Maximum Treatment Rate (BBLS/Min)

Details

ADDITIONAL INFORMATION AND/OR LIST OF ATTACHMENTS

Attached are the Certified well location plat and a well bore diagram. The directional surveys, Open hole logs and CBL logs will be sent directly to you from the contractors.

I hereby swear or affirm that the information provided is true, complete and correct as determined from all available records.	Email Address mglenn@slawsoncompanies.com		Date 11/26/2012
Signature	Printed Name **Matthew Glenn**	Title **Engineering Technician**	

SECI_CWA308-0020

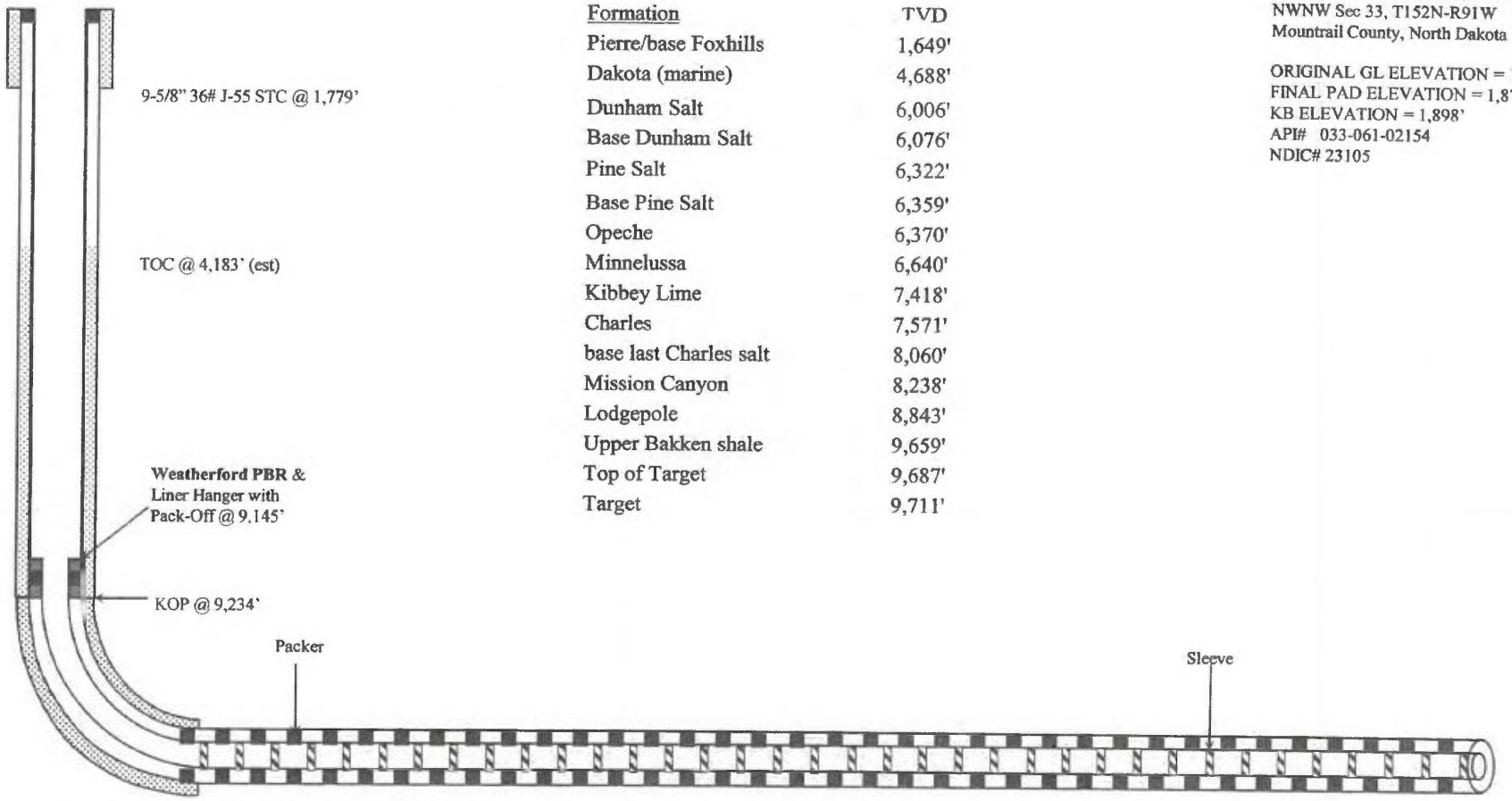
SLAWSON
exploration company, inc.

WELLBORE DIAGRAM
Lunker Federal #2-33-4H

Location: 250' FNL and 1,200' FWL
NWNW Sec 33, T152N-R91W
Mountrail County, North Dakota

ORIGINAL GL ELEVATION = 1,875'
FINAL PAD ELEVATION = 1,875'
KB ELEVATION = 1,898'
API# 033-061-02154
NDIC# 23105

Formation	TVD
Pierre/base Foxhills	1,649'
Dakota (marine)	4,688'
Dunham Salt	6,006'
Base Dunham Salt	6,076'
Pine Salt	6,322'
Base Pine Salt	6,359'
Opeche	6,370'
Minnelussa	6,640'
Kibbey Lime	7,418'
Charles	7,571'
base last Charles salt	8,060'
Mission Canyon	8,238'
Lodgepole	8,843'
Upper Bakken shale	9,659'
Top of Target	9,687'
Target	9,711'



7" 32# P-110 from	Surface	to	242'
7" 29# P-110 from	242'	to	5,779'
7" 32# P-110 from	5,779'	to	8,233'
7" 29# P-110 from	8,233'	to	10,041'

Weatherford Completion System:

10,355' of 4-1/2" 11.6# P-110 BTC liner with 35 packers, 35 sleeves and a liner hanger with pack-off. Set Liner at 19,530'

Lateral TD @ 19,536 MD,
9,729' TVD
9,495 of Open Hole

Industrial Commission of North Dakota
Oil and Gas Division
Verbal Approval To Purchase and Transport Oil

Well or Facility No **23105**

Tight Hole **Yes**

OPERATOR

Operator	Representative	Rep Phone
SLAWSON EXPLORATION COMPANY, INC.	**Larry Garcia**	**(701) 651-4664**

WELL INFORMATION

Well Name: **LUNKER FEDERAL 2-33-4H**

Inspector: **Robert Garbe**

Well Location	QQ	Sec	Twp		Rng		County
	NWNW	**33**	**152**	**N**	**91**	**W**	**MOUNTRAIL**

Field: **VAN HOOK**

Footages: **250** Feet From the **N** Line; **1200** Feet From the **W** Line

Pool: **BAKKEN**

Date of First Production Through Permanent Wellhead: **This Is Not The First Sales**

PURCHASER / TRANSPORTER

Purchaser	Transporter

TANK BATTERY

Unit Tank Battery Number :

SALES INFORMATION **This Is Not The First Sales**

ESTIMATED BARRELS TO BE SOLD	ACTUAL BARRELS SOLD	DATE
BBLS	BBLS	
BBLS	BBLS	
BBLS	BBLS	
BBLS	BBLS	
BBLS	BBLS	
BBLS	BBLS	
BBLS	BBLS	
BBLS	BBLS	
BBLS	BBLS	

DETAILS

Oil picked up off location will also be hauled to the Lunker Fed #1 (#18499) and put in frac tanks and uprights.

Start Date	**12/13/2012**
Date Approved	**12/13/2012**
Approved By	**Robert Garbe**

Industrial Commission of North Dakota
Oil and Gas Division
Verbal Approval To Purchase and Transport Oil

Well or Facility No **23105**

Tight Hole **Yes**

OPERATOR

Operator	Representative	Rep Phone
SLAWSON EXPLORATION COMPANY, INC.	**Kyle Waliezer**	**(701) 421-0762**

WELL INFORMATION

Well Name: **LUNKER FEDERAL 2-33-4H**

Inspector: **Robert Garbe**

Well Location	QQ	Sec	Twp		Rng	
	NWNW	**33**	**152**	**N**	**91**	**W**

County: **MOUNTRAIL**

Field: **VAN HOOK**

Footages: **250** Feet From the **N** Line; **1200** Feet From the **W** Line

Pool: **BAKKEN**

Date of First Production Through Permanent Wellhead: **This Is Not The First Sales**

PURCHASER / TRANSPORTER

Purchaser	Transporter
	KNS Enterprise, LLC

TANK BATTERY

Unit Tank Battery Number :

SALES INFORMATION **This Is Not The First Sales**

ESTIMATED BARRELS TO BE SOLD	ACTUAL BARRELS SOLD	DATE
BBLS	BBLS	
BBLS	BBLS	
BBLS	BBLS	
BBLS	BBLS	
BBLS	BBLS	
BBLS	BBLS	
BBLS	BBLS	
BBLS	BBLS	
BBLS	BBLS	

DETAILS

Gave verbal to move fluid recovered from location to Slawson owned frac tanks on the Pathfinder central facility

Start Date	**12/13/2012**
Date Approved	**12/13/2012**
Approved By	**Robert Garbe**

6724 Corporation Pkwy
Fort Worth, Texas 76126
(817) 717-1820

Directional Survey Certification Form

Slawson	**Lunker Federal 2-33-4H**	**August 25, 2012**
Company	Well Name	Final Report Date
ND-SLW-0045	**Mountrail County, ND**	**33-061-02154**
Job Number	County/State	API Number
N 47 56' 53.52000"	**W 102 20' 17.88000"**	**33-152-91**
Surface Latitude	Surface Longitude	Sec. - TWP - Range
NAD83 ND State Plane, Northern Zone, US Feet	**Cyclone 27**	**24'**
Datum	Rig Contractor/ Name	RKB Height

Survey Depths **0** to **9138** ft

Type of Survey **Measurements While Drilling (MWD)**

Survey Depths _____ _____ ft

Type of Survey _____

Site Supervisor **Jason Holden**

The data submitted in this report conforms to the standards and procedures as set forth by Schlumberger. This report represents a true and correct directional wellbore survey based on original survey data obtained at the well site.

Jason Holden
District - FSS

9-15-2012
Date

This document has been subscribed and affirmed, or sworn before me in the county of Ward in the state of North Dakota, this _____ day of _____, 20____.

_____

Lunker Federal 2-33-4H MWD 0' to 9138' Survey Report

(Def Survey)

Report Date:	August 25, 2012 - 11:54 AM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	Slawson	**Vertical Section Azimuth:**	179.320 ° (True North)
Field:	ND, Mountrail County (NAD 83 NZ) 2011	**Vertical Section Origin:**	0.000 ft, 0.000 ft
Structure / Slot:	Slawson (Lunker Federal 2-33-4H) Cyclone 27 / Lunker Federal 2-33-4H	**TVD Reference Datum:**	RKB
Well:	Lunker Federal 2-33-4H	**TVD Reference Elevation:**	1899.000 ft above MSL
Borehole:	Original Hole	**Seabed / Ground Elevation:**	1875.000 ft above MSL
UWI / API#:	ND-SLW-0045 / 33-061-02154	**Magnetic Declination:**	7.650 °
Survey Name:	Lunker Federal 2-33-4H MWD 0' to 9138'	**Total Field Strength:**	56616.341 nT
Survey Date:	August 25, 2012	**Magnetic Dip Angle:**	73.118 °
Tort / AHD / DDI / ERD Ratio:	36.212 ° / 152.172 ft / 3.741 / 0.017	**Declination Date:**	August 25, 2012
Coordinate Reference System:	NAD83 North Dakota State Plane, Northern Zone, US Feet	**Magnetic Declination Model:**	BGGM 2012
Location Lat / Long:	N 47° 56' 53.52000", W 102° 20' 17.88000"	**North Reference:**	True North
Location Grid N/E Y/X:	N 351247.384 ftUS, E 1518042.916 ftUS	**Grid Convergence Used:**	0.000 °
CRS Grid Convergence Angle:	-1.36794044 °	**Total Corr Mag North->True North:**	7.650 °
Grid Scale Factor:	0.99993867	**Local Coord Referenced To:**	Well Head

Comments	MD (ft)	Incl (°)	Azim True (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
Surface	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	351247.38	1518042.92	N 47 56 53.52	W 102 20 17.88
Begin MED Survey	170.00	0.31	64.16	170.00	-0.20	0.20	0.41	0.18	351247.57	1518043.33	N 47 56 53.52	W 102 20 17.87
	262.00	0.62	76.64	262.00	-0.41	0.42	1.12	0.35	351247.78	1518044.05	N 47 56 53.52	W 102 20 17.86
	353.00	0.40	26.55	352.99	-0.80	0.82	1.74	0.52	351248.16	1518044.68	N 47 56 53.53	W 102 20 17.85
	445.00	0.40	38.06	444.99	-1.34	1.36	2.08	0.09	351248.70	1518045.03	N 47 56 53.53	W 102 20 17.85
	536.00	0.40	73.44	535.99	-1.67	1.70	2.59	0.27	351249.02	1518045.54	N 47 56 53.54	W 102 20 17.84
	625.00	0.22	230.45	624.99	-1.65	1.68	2.75	0.68	351249.00	1518045.71	N 47 56 53.54	W 102 20 17.84
	718.00	0.40	223.86	717.99	-1.31	1.33	2.39	0.20	351248.66	1518045.34	N 47 56 53.53	W 102 20 17.84
	810.00	0.31	151.83	809.99	-0.86	0.88	2.28	0.46	351248.21	1518045.22	N 47 56 53.53	W 102 20 17.85
	897.00	0.48	105.74	896.98	-0.54	0.58	2.75	0.40	351247.90	1518045.67	N 47 56 53.53	W 102 20 17.84
	987.00	0.79	60.03	986.98	-0.74	0.78	3.65	0.63	351248.08	1518046.58	N 47 56 53.53	W 102 20 17.83
	1078.00	0.79	73.83	1077.97	-1.22	1.27	4.79	0.21	351248.54	1518047.74	N 47 56 53.53	W 102 20 17.81
	1170.00	0.62	60.43	1169.96	-1.63	1.70	5.83	0.26	351248.94	1518048.79	N 47 56 53.54	W 102 20 17.79
	1262.00	0.62	65.44	1261.96	-2.07	2.15	6.72	0.06	351249.37	1518049.68	N 47 56 53.54	W 102 20 17.78
	1354.00	0.31	105.16	1353.95	-2.20	2.29	7.41	0.47	351249.50	1518050.38	N 47 56 53.54	W 102 20 17.77
	1446.00	0.40	72.47	1445.95	-2.23	2.32	7.96	0.24	351249.51	1518050.93	N 47 56 53.54	W 102 20 17.76
	1538.00	0.31	34.46	1537.95	-2.52	2.62	8.41	0.27	351249.81	1518051.38	N 47 56 53.55	W 102 20 17.76
	1632.00	0.22	105.34	1631.95	-2.68	2.79	8.72	0.34	351249.96	1518051.70	N 47 56 53.55	W 102 20 17.75
	1683.00	0.31	160.93	1682.95	-2.52	2.63	8.86	0.51	351249.80	1518051.84	N 47 56 53.55	W 102 20 17.75
	1727.00	0.40	161.77	1726.95	-2.26	2.37	8.95	0.20	351249.54	1518051.92	N 47 56 53.54	W 102 20 17.75
	1779.00	0.62	178.16	1778.95	-1.81	1.92	9.02	0.50	351249.09	1518051.97	N 47 56 53.54	W 102 20 17.75
	1858.00	1.10	176.36	1857.94	-0.63	0.73	9.08	0.61	351247.90	1518052.01	N 47 56 53.53	W 102 20 17.75
	1955.00	1.50	203.87	1954.91	1.46	-1.36	8.62	0.75	351245.82	1518051.50	N 47 56 53.51	W 102 20 17.75
	2044.00	1.58	210.37	2043.88	3.57	-3.48	7.53	0.22	351243.72	1518050.36	N 47 56 53.49	W 102 20 17.77
	2135.00	1.32	214.06	2134.85	5.51	-5.43	6.31	0.30	351241.80	1518049.09	N 47 56 53.47	W 102 20 17.79
	2229.00	0.79	185.76	2228.84	7.04	-6.97	5.64	0.77	351240.28	1518048.39	N 47 56 53.45	W 102 20 17.80
	2324.00	1.01	161.55	2323.83	8.49	-8.42	5.84	0.46	351238.83	1518048.55	N 47 56 53.44	W 102 20 17.79
	2423.00	1.71	129.55	2422.80	10.27	-10.19	7.25	1.02	351237.03	1518049.92	N 47 56 53.42	W 102 20 17.77
	2512.00	2.20	139.05	2511.75	12.43	-12.32	9.40	0.66	351234.84	1518052.02	N 47 56 53.40	W 102 20 17.74
	2605.00	2.42	112.33	2604.67	14.56	-14.42	12.38	1.17	351232.68	1518054.95	N 47 56 53.38	W 102 20 17.70
	2699.00	2.50	138.04	2698.59	16.88	-16.70	15.59	1.17	351230.32	1518058.10	N 47 56 53.36	W 102 20 17.65
	2795.00	1.10	153.55	2794.54	19.28	-19.08	17.40	1.53	351227.90	1518059.85	N 47 56 53.33	W 102 20 17.62
	2888.00	1.41	152.85	2887.52	21.11	-20.90	18.32	0.33	351226.06	1518060.73	N 47 56 53.31	W 102 20 17.61
	2984.00	1.71	153.77	2983.48	23.46	-23.23	19.49	0.31	351223.70	1518061.85	N 47 56 53.29	W 102 20 17.59
	3078.00	1.49	146.25	3077.45	25.75	-25.51	20.79	0.32	351221.39	1518063.09	N 47 56 53.27	W 102 20 17.57
	3172.00	1.01	151.35	3171.42	27.51	-27.25	21.87	0.52	351219.62	1518064.12	N 47 56 53.25	W 102 20 17.56
	3266.00	0.88	163.04	3265.41	28.93	-28.67	22.47	0.25	351218.19	1518064.70	N 47 56 53.24	W 102 20 17.55
	3360.00	0.62	150.96	3359.40	30.07	-29.80	22.93	0.32	351217.05	1518065.13	N 47 56 53.23	W 102 20 17.54
	3454.00	0.48	137.46	3453.40	30.81	-30.54	23.44	0.20	351216.30	1518065.62	N 47 56 53.22	W 102 20 17.54
	3549.00	0.50	109.47	3548.39	31.25	-30.97	24.10	0.25	351215.85	1518066.27	N 47 56 53.21	W 102 20 17.53
	3643.00	0.40	68.65	3642.39	31.28	-30.99	24.80	0.35	351215.82	1518066.97	N 47 56 53.21	W 102 20 17.52
	3737.00	0.31	87.45	3736.39	31.15	-30.85	25.36	0.16	351215.94	1518067.53	N 47 56 53.22	W 102 20 17.51
	3831.00	0.48	66.14	3830.39	30.99	-30.68	25.97	0.24	351216.09	1518068.15	N 47 56 53.22	W 102 20 17.50
	3924.00	0.31	55.24	3923.39	30.70	-30.38	26.53	0.20	351216.38	1518068.72	N 47 56 53.22	W 102 20 17.49
	4018.00	0.40	94.66	4017.38	30.58	-30.26	27.07	0.27	351216.48	1518069.25	N 47 56 53.22	W 102 20 17.48
	4112.00	0.40	107.14	4111.38	30.71	-30.39	27.71	0.09	351216.35	1518069.89	N 47 56 53.22	W 102 20 17.47
	4207.00	0.79	80.56	4206.38	30.72	-30.38	28.67	0.49	351216.33	1518070.85	N 47 56 53.22	W 102 20 17.46
	4301.00	1.10	65.13	4300.36	30.25	-29.89	30.13	0.42	351216.78	1518072.32	N 47 56 53.23	W 102 20 17.44
	4396.00	1.19	79.24	4395.34	29.70	-29.32	31.93	0.31	351217.31	1518074.13	N 47 56 53.23	W 102 20 17.41
	4489.00	1.49	115.23	4488.32	30.06	-29.66	33.97	0.94	351216.92	1518076.17	N 47 56 53.23	W 102 20 17.38
	4583.00	1.89	110.04	4582.28	31.14	-30.71	36.53	0.46	351215.81	1518078.70	N 47 56 53.22	W 102 20 17.34
	4678.00	0.79	93.74	4677.25	31.75	-31.29	38.66	1.21	351215.18	1518080.81	N 47 56 53.21	W 102 20 17.31
	4772.00	0.40	106.44	4771.25	31.89	-31.43	39.62	0.44	351215.02	1518081.77	N 47 56 53.21	W 102 20 17.30
	4865.00	0.48	92.07	4864.24	32.01	-31.53	40.32	0.15	351214.90	1518082.47	N 47 56 53.21	W 102 20 17.29
	4958.00	1.32	68.65	4957.23	31.65	-31.16	41.71	0.97	351215.24	1518083.86	N 47 56 53.21	W 102 20 17.27
	5052.00	2.02	62.36	5051.19	30.52	-29.99	44.18	0.77	351216.35	1518086.37	N 47 56 53.22	W 102 20 17.23
	5145.00	2.90	66.45	5144.11	28.86	-28.29	47.79	0.96	351217.96	1518090.02	N 47 56 53.24	W 102 20 17.18
	5238.00	2.50	65.13	5237.00	27.11	-26.50	51.79	0.44	351219.66	1518094.05	N 47 56 53.26	W 102 20 17.12
	5331.00	2.50	66.45	5329.91	25.49	-24.84	55.49	0.06	351221.23	1518097.79	N 47 56 53.27	W 102 20 17.06
	5425.00	1.89	54.94	5423.84	23.82	-23.13	58.64	0.80	351222.87	1518100.98	N 47 56 53.29	W 102 20 17.02
	5519.00	1.10	24.74	5517.81	22.13	-21.42	60.28	1.16	351224.54	1518102.67	N 47 56 53.31	W 102 20 16.99
	5613.00	1.10	359.04	5611.80	20.41	-19.70	60.64	0.52	351226.25	1518103.07	N 47 56 53.33	W 102 20 16.99
	5704.00	1.10	338.16	5702.78	18.73	-18.01	60.31	0.44	351227.94	1518102.77	N 47 56 53.34	W 102 20 16.99
	5799.00	1.41	324.36	5797.76	16.92	-16.22	59.28	0.45	351229.76	1518101.79	N 47 56 53.36	W 102 20 17.01
	5893.00	1.32	314.87	5891.73	15.20	-14.51	57.84	0.26	351231.50	1518100.39	N 47 56 53.38	W 102 20 17.03

Comments	MD (ft)	Incl (°)	Azim True (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	5991.00	1.49	313.95	5989.70	13.50	-12.83	56.13	0.17	351233.22	1518098.72	N 47 56 53.39	W 102 20 17.06
	6085.00	1.41	310.17	6083.67	11.88	-11.24	54.36	0.13	351234.85	1518096.99	N 47 56 53.41	W 102 20 17.08
	6180.00	1.32	322.87	6178.64	10.24	-9.61	52.81	0.33	351236.52	1518095.48	N 47 56 53.43	W 102 20 17.10
	6279.00	1.20	325.77	6277.62	8.46	-7.84	51.54	0.14	351238.31	1518094.25	N 47 56 53.44	W 102 20 17.12
	6369.00	0.79	328.54	6367.61	7.14	-6.54	50.68	0.46	351239.64	1518093.43	N 47 56 53.46	W 102 20 17.14
	6463.00	1.01	330.65	6461.60	5.85	-5.26	49.94	0.24	351240.93	1518092.71	N 47 56 53.47	W 102 20 17.15
	6555.00	0.79	0.75	6553.58	4.51	-3.92	49.55	0.56	351242.28	1518092.36	N 47 56 53.48	W 102 20 17.15
	6647.00	1.10	359.26	6645.57	2.99	-2.40	49.55	0.34	351243.80	1518092.39	N 47 56 53.50	W 102 20 17.15
	6740.00	1.10	8.97	6738.55	1.22	-0.63	49.67	0.20	351245.57	1518092.56	N 47 56 53.51	W 102 20 17.15
	6836.00	0.70	359.56	6834.54	-0.28	0.87	49.81	0.44	351247.06	1518092.73	N 47 56 53.53	W 102 20 17.15
	6930.00	0.79	341.63	6928.53	-1.47	2.06	49.61	0.26	351248.26	1518092.55	N 47 56 53.54	W 102 20 17.15
	7025.00	0.48	342.73	7023.53	-2.47	3.06	49.28	0.33	351249.27	1518092.25	N 47 56 53.55	W 102 20 17.16
	7119.00	0.62	339.13	7117.52	-3.33	3.91	48.98	0.15	351250.12	1518091.98	N 47 56 53.56	W 102 20 17.16
	7212.00	0.79	356.44	7210.52	-4.44	5.02	48.76	0.29	351251.24	1518091.78	N 47 56 53.57	W 102 20 17.16
	7300.00	0.79	341.94	7298.51	-5.63	6.20	48.54	0.23	351252.43	1518091.59	N 47 56 53.58	W 102 20 17.17
	7393.00	0.88	346.16	7391.50	-6.93	7.51	48.17	0.12	351253.74	1518091.25	N 47 56 53.59	W 102 20 17.17
	7492.00	0.70	347.17	7490.49	-8.26	8.83	47.85	0.18	351255.07	1518090.96	N 47 56 53.61	W 102 20 17.18
	7586.00	0.88	335.83	7584.48	-9.49	10.05	47.43	0.25	351256.30	1518090.57	N 47 56 53.62	W 102 20 17.18
	7675.00	0.70	8.84	7673.47	-10.65	11.21	47.23	0.54	351257.47	1518090.40	N 47 56 53.63	W 102 20 17.19
	7770.00	0.88	26.46	7768.46	-11.87	12.44	47.65	0.32	351258.68	1518090.84	N 47 56 53.64	W 102 20 17.18
	7868.00	0.88	41.84	7866.45	-13.10	13.67	48.48	0.24	351259.90	1518091.71	N 47 56 53.65	W 102 20 17.17
	7963.00	1.01	58.45	7961.44	-14.06	14.65	49.68	0.32	351260.85	1518092.93	N 47 56 53.66	W 102 20 17.15
	8056.00	0.88	72.16	8054.43	-14.70	15.30	51.06	0.28	351261.46	1518094.33	N 47 56 53.67	W 102 20 17.13
	8151.00	1.01	84.95	8149.41	-14.97	15.60	52.59	0.26	351261.72	1518095.86	N 47 56 53.67	W 102 20 17.11
	8245.00	0.88	86.14	8243.40	-15.08	15.72	54.14	0.14	351261.81	1518097.41	N 47 56 53.68	W 102 20 17.08
	8340.00	1.01	80.07	8338.39	-15.25	15.91	55.69	0.17	351261.96	1518098.97	N 47 56 53.68	W 102 20 17.06
	8434.00	1.01	87.76	8432.37	-15.41	16.09	57.33	0.14	351262.10	1518100.61	N 47 56 53.68	W 102 20 17.04
	8528.00	1.01	77.96	8526.36	-15.59	16.30	58.97	0.18	351262.27	1518102.26	N 47 56 53.68	W 102 20 17.01
	8622.00	0.79	89.43	8620.35	-15.76	16.47	60.43	0.30	351262.41	1518103.72	N 47 56 53.68	W 102 20 16.99
	8714.00	0.70	84.33	8712.34	-15.80	16.54	61.62	0.12	351262.44	1518104.91	N 47 56 53.68	W 102 20 16.97
	8808.00	0.79	90.75	8806.33	-15.84	16.58	62.84	0.13	351262.46	1518106.13	N 47 56 53.68	W 102 20 16.96
	8901.00	0.70	87.54	8899.32	-15.84	16.60	64.05	0.11	351262.45	1518107.34	N 47 56 53.68	W 102 20 16.94
	8990.00	0.48	83.46	8988.32	-15.89	16.67	64.96	0.25	351262.49	1518108.26	N 47 56 53.68	W 102 20 16.93
	9086.00	0.70	75.37	9084.31	-16.08	16.86	65.93	0.24	351262.66	1518109.23	N 47 56 53.69	W 102 20 16.91
End MWD Survey	9138.00	0.79	72.95	9136.31	-16.25	17.05	66.58	0.18	351262.83	1518109.88	N 47 56 53.69	W 102 20 16.90
BTS	9181.00	0.79	72.95	9179.31	-16.42	17.22	67.15	0.00	351262.99	1518110.45	N 47 56 53.69	W 102 20 16.89

Survey Type: Def Survey

Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma

Survey Program:

Description	MD From (ft)	MD To (ft)	EOU Freq (ft)	Survey Tool Type	Borehole / Survey
	0.000	24.000	Act Stns	SLB_MWD-STD-Depth Only	Original Hole / Lunker Federal 2-33-4H MWD 0' to 9138'
	24.000	24.000	Act Stns	SLB_MWD-STD-Depth Only	Original Hole / Lunker Federal 2-33-4H MWD 0' to 9138'
	24.000	9181.000	Act Stns	SLB_MWD-STD	Original Hole / Lunker Federal 2-33-4H MWD 0' to 9138'

Slawson Exploration - RM

Mountrail County, ND
Sec 33, T152N, R91W, 5th PM
Lunker Federal 2-33-4H

Wellbore #1

Survey: MWD

DDC Survey Report

03 October, 2012

The DIRECTIONAL DRILLING COMPANY

Survey Certification Sheet

Slawson Exploration	RM-12618	10/03/2012
Company	Job Number	Date

Sec 33,T152N,R91W,5thPM	Lunker Federal 2-33-4H	Mountrail,ND
Lease	Well Name	County & State

Surveyed from a depth of: 9138 feet to 19536 feet MD

Type of Survey: MWD

Directional Supervisor/Surveyor: Charlie Reece

The data and calculations for this survey have been checked by me and conform to the standards and procedures set forth by **The Directional Drilling Company (DDC)**. This report represents a true and correct Directional survey of this well based on the original data obtained at the well site. Wellbore Coordinates are calculated using minimum curvature.

Larry Wright
MWD General Manager

• 11390 FM 830 • Willis, Texas 77318 •
• PH 936-856-4332 • FAX 936-856-8678 •

Company:	Slawson Exploration - RM	**Local Co-ordinate Reference:**	Well Lunker Federal 2-33-4H
Project:	Mountrail County, ND	**TVD Reference:**	WELL @ 1899.0usft (Cyclone #27)
Site:	Sec 33, T152N, R91W, 5th PM	**MD Reference:**	WELL @ 1899.0usft (Cyclone #27)
Well:	Lunker Federal 2-33-4H	**North Reference:**	True
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM 5000.1 Single User Db

Project Mountrail County, ND

Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	North Dakota Northern Zone		

Site Sec 33, T152N, R91W, 5th PM

Site Position:		**Northing:**	351,263.48 usft	**Latitude:**	47° 56' 53.650 N
From:	Lat/Long	**Easting:**	1,517,920.74 usft	**Longitude:**	102° 20' 19.680 W
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	-1.37 °

Well Lunker Federal 2-33-4H

Well Position	**+N/-S**	0.0 usft	**Northing:**	351,263.47 usft	**Latitude:**	47° 56' 53.650 N
	+E/-W	0.0 usft	**Easting:**	1,517,920.74 usft	**Longitude:**	102° 20' 19.680 W
Position Uncertainty		0.0 usft	**Wellhead Elevation:**	usft	**Ground Level:**	1,875.0 usft

Wellbore Wellbore #1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	8/15/2012	7.65	73.16	56,665

Design Wellbore #1

Audit Notes:

Version:	1.0	**Phase:**	ACTUAL	**Tie On Depth:**	0.0

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	179.32

Survey Program **Date** 10/3/2012

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
170.0	9,181.0	MWD - EXTREME (Wellbore #1)	MWD default	MWD - Standard
9,138.0	19,536.0	MWD (Wellbore #1)	MWD default	MWD - Standard

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
TIE IN @ 9138' MD / 9136' TVD									
9,138.0	0.79	72.95	9,136.3	17.0	66.6	-16.3	0.00	0.00	0.00
9,169.0	0.80	94.80	9,167.3	17.1	67.0	-16.3	0.97	0.03	70.48
9,187.0	1.90	125.50	9,185.3	16.9	67.4	-16.1	7.11	6.11	170.56
9,200.0	3.20	135.20	9,198.3	16.5	67.8	-15.7	10.50	10.00	74.62
9,230.0	7.80	145.60	9,228.1	14.3	69.5	-13.4	15.63	15.33	34.67
9,260.0	12.10	146.10	9,257.7	10.0	72.4	-9.1	14.34	14.33	1.67
9,292.0	16.90	146.00	9,288.7	3.3	76.9	-2.4	15.00	15.00	-0.31
9,323.0	20.80	150.60	9,318.0	-5.2	82.1	6.2	13.45	12.58	14.84
9,354.0	23.80	155.10	9,346.7	-15.7	87.5	16.7	11.13	9.68	14.52

Company:	Slawson Exploration - RM	**Local Co-ordinate Reference:**	Well Lunker Federal 2-33-4H
Project:	Mountrail County, ND	**TVD Reference:**	WELL @ 1899.0usft (Cyclone #27)
Site:	Sec 33, T152N, R91W, 5th PM	**MD Reference:**	WELL @ 1899.0usft (Cyclone #27)
Well:	Lunker Federal 2-33-4H	**North Reference:**	True
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,385.0	27.00	160.80	9,374.7	-28.0	92.4	29.1	12.98	10.32	18.39
9,416.0	30.50	166.60	9,401.9	-42.3	96.6	43.5	14.43	11.29	18.71
9,448.0	33.80	171.70	9,428.9	-59.0	99.7	60.2	13.34	10.31	15.94
9,479.0	37.00	174.10	9,454.2	-76.8	101.9	78.1	11.25	10.32	7.74
9,510.0	41.10	175.30	9,478.3	-96.3	103.7	97.5	13.45	13.23	3.87
9,540.0	44.50	176.10	9,500.3	-116.6	105.3	117.9	11.48	11.33	2.67
9,571.0	47.20	176.00	9,521.9	-138.8	106.8	140.1	8.71	8.71	-0.32
9,601.0	49.50	176.20	9,541.8	-161.2	108.3	162.4	7.68	7.67	0.67
9,633.0	52.80	176.00	9,561.9	-186.0	110.0	187.3	10.32	10.31	-0.63
9,664.0	56.30	177.70	9,579.9	-211.2	111.4	212.5	12.14	11.29	5.48
9,695.0	59.20	179.50	9,596.4	-237.4	112.0	238.8	10.56	9.35	5.81
9,727.0	62.40	181.10	9,612.0	-265.4	111.9	266.7	10.91	10.00	5.00
9,758.0	65.30	181.40	9,625.7	-293.2	111.3	294.5	9.40	9.35	0.97
9,789.0	67.80	181.70	9,638.0	-321.6	110.5	322.9	8.11	8.06	0.97
9,821.0	70.00	181.30	9,649.5	-351.5	109.7	352.7	6.97	6.88	-1.25
9,852.0	73.20	180.00	9,659.3	-380.9	109.4	382.1	11.06	10.32	-4.19
9,882.0	75.70	179.10	9,667.4	-409.8	109.6	411.0	8.82	8.33	-3.00
9,913.0	78.20	179.00	9,674.4	-440.0	110.1	441.2	8.07	8.06	-0.32
9,944.0	80.90	179.60	9,680.0	-470.4	110.5	471.7	8.92	8.71	1.94
9,974.0	83.70	180.70	9,684.0	-500.2	110.4	501.4	10.02	9.33	3.67
9,993.0	85.40	181.30	9,685.8	-519.1	110.1	520.3	9.48	8.95	3.16
10,042.0	88.60	181.90	9,688.4	-568.0	108.7	569.2	6.64	6.53	1.22
10,079.0	88.20	181.50	9,689.4	-604.9	107.6	606.2	1.53	-1.08	-1.08
10,110.0	88.50	181.80	9,690.3	-635.9	106.7	637.1	1.37	0.97	0.97
10,174.0	91.30	182.00	9,690.4	-699.9	104.6	701.1	4.39	4.38	0.31
10,237.0	90.80	181.50	9,689.3	-762.8	102.7	764.0	1.12	-0.79	-0.79
10,300.0	91.30	181.40	9,688.1	-825.8	101.1	827.0	0.81	0.79	-0.16
10,363.0	91.40	181.90	9,686.6	-888.8	99.3	889.9	0.81	0.16	0.79
10,426.0	89.90	181.70	9,685.9	-951.7	97.3	952.8	2.40	-2.38	-0.32
10,488.0	90.20	181.70	9,685.8	-1,013.7	95.4	1,014.8	0.48	0.48	0.00
10,551.0	89.10	181.10	9,686.2	-1,076.7	93.9	1,077.7	1.99	-1.75	-0.95
10,613.0	90.20	181.50	9,686.6	-1,138.7	92.5	1,139.7	1.89	1.77	0.65
10,676.0	89.70	180.70	9,686.7	-1,201.7	91.3	1,202.6	1.50	-0.79	-1.27
10,738.0	90.20	181.40	9,686.7	-1,263.6	90.2	1,264.6	1.39	0.81	1.13
10,801.0	89.90	181.10	9,686.7	-1,326.6	88.8	1,327.6	0.67	-0.48	-0.48
10,864.0	88.50	179.90	9,687.5	-1,389.6	88.2	1,390.6	2.93	-2.22	-1.90
10,927.0	89.90	180.60	9,688.4	-1,452.6	88.0	1,453.5	2.48	2.22	1.11
10,989.0	89.80	179.90	9,688.6	-1,514.6	87.7	1,515.5	1.14	-0.16	-1.13
11,052.0	89.00	179.60	9,689.2	-1,577.6	88.0	1,578.5	1.36	-1.27	-0.48
11,115.0	89.70	180.40	9,690.0	-1,640.6	88.0	1,641.5	1.69	1.11	1.27
11,177.0	89.60	180.40	9,690.3	-1,702.6	87.5	1,703.5	0.16	-0.16	0.00
11,240.0	89.60	180.60	9,690.8	-1,765.6	87.0	1,766.5	0.32	0.00	0.32
11,303.0	89.20	180.40	9,691.4	-1,828.6	86.4	1,829.5	0.71	-0.63	-0.32

Company:	Slawson Exploration - RM	**Local Co-ordinate Reference:**	Well Lunker Federal 2-33-4H
Project:	Mountrail County, ND	**TVD Reference:**	WELL @ 1899.0usft (Cyclone #27)
Site:	Sec 33, T152N, R91W, 5th PM	**MD Reference:**	WELL @ 1899.0usft (Cyclone #27)
Well:	Lunker Federal 2-33-4H	**North Reference:**	True
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
11,365.0	88.40	180.00	9,692.7	-1,890.6	86.2	1,891.5	1.44	-1.29	-0.65
11,428.0	87.30	179.60	9,695.1	-1,953.5	86.4	1,954.4	1.86	-1.75	-0.63
11,490.0	89.90	180.90	9,696.6	-2,015.5	86.2	2,016.4	4.69	4.19	2.10
11,553.0	90.20	181.50	9,696.6	-2,078.5	84.8	2,079.3	1.06	0.48	0.95
11,616.0	89.00	180.60	9,697.0	-2,141.5	83.7	2,142.3	2.38	-1.90	-1.43
11,678.0	90.20	181.70	9,697.4	-2,203.5	82.4	2,204.3	2.63	1.94	1.77
11,741.0	91.40	181.40	9,696.6	-2,266.4	80.7	2,267.2	1.96	1.90	-0.48
11,804.0	88.30	179.60	9,696.7	-2,329.4	80.2	2,330.2	5.69	-4.92	-2.86
11,866.0	90.20	180.00	9,697.5	-2,391.4	80.4	2,392.2	3.13	3.06	0.65
11,929.0	90.30	179.50	9,697.3	-2,454.4	80.7	2,455.2	0.81	0.16	-0.79
11,992.0	89.90	177.50	9,697.1	-2,517.4	82.3	2,518.2	3.24	-0.63	-3.17
12,054.0	89.90	176.70	9,697.3	-2,579.3	85.5	2,580.1	1.29	0.00	-1.29
12,118.0	90.10	176.60	9,697.3	-2,643.2	89.2	2,644.1	0.35	0.31	-0.16
12,181.0	88.20	176.20	9,698.2	-2,706.0	93.2	2,707.0	3.08	-3.02	-0.63
12,243.0	89.90	177.90	9,699.2	-2,768.0	96.4	2,768.9	3.88	2.74	2.74
12,307.0	90.60	178.90	9,698.9	-2,831.9	98.1	2,832.9	1.91	1.09	1.56
12,370.0	89.80	178.50	9,698.7	-2,894.9	99.6	2,895.9	1.42	-1.27	-0.63
12,432.0	89.10	177.50	9,699.3	-2,956.9	101.7	2,957.9	1.97	-1.13	-1.61
12,496.0	92.50	179.60	9,698.4	-3,020.8	103.4	3,021.8	6.24	5.31	3.28
12,559.0	92.50	179.80	9,695.7	-3,083.8	103.7	3,084.8	0.32	0.00	0.32
12,622.0	90.00	178.90	9,694.3	-3,146.7	104.4	3,147.8	4.22	-3.97	-1.43
12,684.0	90.90	179.50	9,693.8	-3,208.7	105.3	3,209.8	1.74	1.45	0.97
12,747.0	91.40	179.90	9,692.5	-3,271.7	105.6	3,272.7	1.02	0.79	0.63
12,810.0	89.20	179.50	9,692.2	-3,334.7	105.9	3,335.7	3.55	-3.49	-0.63
12,873.0	88.70	179.20	9,693.4	-3,397.7	106.6	3,398.7	0.93	-0.79	-0.48
12,936.0	90.30	180.70	9,693.9	-3,460.7	106.7	3,461.7	3.48	2.54	2.38
12,999.0	89.80	180.50	9,693.9	-3,523.7	106.0	3,524.7	0.85	-0.79	-0.32
13,062.0	89.50	180.60	9,694.2	-3,586.7	105.4	3,587.7	0.50	-0.48	0.16
13,126.0	90.10	181.30	9,694.5	-3,650.7	104.4	3,651.7	1.44	0.94	1.09
13,189.0	90.30	181.90	9,694.3	-3,713.6	102.6	3,714.6	1.00	0.32	0.95
13,252.0	90.10	181.80	9,694.0	-3,776.6	100.6	3,777.5	0.35	-0.32	-0.16
13,315.0	91.00	182.90	9,693.4	-3,839.6	98.0	3,840.5	2.26	1.43	1.75
13,378.0	88.30	182.20	9,693.8	-3,902.5	95.2	3,903.3	4.43	-4.29	-1.11
13,441.0	89.50	182.90	9,695.0	-3,965.4	92.4	3,966.2	2.21	1.90	1.11
13,505.0	89.40	182.90	9,695.6	-4,029.3	89.1	4,030.1	0.16	-0.16	0.00
13,568.0	90.10	184.00	9,695.9	-4,092.2	85.4	4,092.9	2.07	1.11	1.75
13,632.0	89.80	184.10	9,696.0	-4,156.1	80.8	4,156.7	0.49	-0.47	0.16
13,695.0	88.80	183.50	9,696.7	-4,218.9	76.7	4,219.5	1.85	-1.59	-0.95
13,758.0	89.60	184.50	9,697.6	-4,281.7	72.3	4,282.3	2.03	1.27	1.59
13,821.0	90.10	185.40	9,697.8	-4,344.5	66.8	4,345.0	1.63	0.79	1.43
13,884.0	88.40	183.80	9,698.6	-4,407.3	61.8	4,407.7	3.71	-2.70	-2.54
13,948.0	88.90	184.60	9,700.1	-4,471.1	57.1	4,471.5	1.47	0.78	1.25
14,010.0	87.40	183.60	9,702.1	-4,532.9	52.7	4,533.2	2.91	-2.42	-1.61

Company:	Slawson Exploration - RM	**Local Co-ordinate Reference:**	Well Lunker Federal 2-33-4H
Project:	Mountrail County, ND	**TVD Reference:**	WELL @ 1899.0usft (Cyclone #27)
Site:	Sec 33, T152N, R91W, 5th PM	**MD Reference:**	WELL @ 1899.0usft (Cyclone #27)
Well:	Lunker Federal 2-33-4H	**North Reference:**	True
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
14,073.0	89.80	183.80	9,703.7	-4,595.8	48.6	4,596.0	3.82	3.81	0.32
14,135.0	88.00	182.60	9,704.8	-4,657.6	45.1	4,657.9	3.49	-2.90	-1.94
14,198.0	90.10	182.20	9,705.9	-4,720.6	42.5	4,720.8	3.39	3.33	-0.63
14,261.0	91.40	181.60	9,705.1	-4,783.5	40.4	4,783.7	2.27	2.06	-0.95
14,325.0	89.40	179.80	9,704.6	-4,847.5	39.6	4,847.7	4.20	-3.13	-2.81
14,387.0	89.60	179.90	9,705.2	-4,909.5	39.8	4,909.7	0.36	0.32	0.16
14,450.0	89.70	180.40	9,705.5	-4,972.5	39.6	4,972.6	0.81	0.16	0.79
14,512.0	89.20	180.40	9,706.1	-5,034.5	39.2	5,034.6	0.81	-0.81	0.00
14,575.0	89.40	181.50	9,706.9	-5,097.5	38.2	5,097.6	1.77	0.32	1.75
14,637.0	89.20	180.00	9,707.7	-5,159.5	37.3	5,159.6	2.44	-0.32	-2.42
14,700.0	90.50	180.40	9,707.8	-5,222.5	37.1	5,222.6	2.16	2.06	0.63
14,763.0	89.70	180.40	9,707.7	-5,285.5	36.7	5,285.6	1.27	-1.27	0.00
14,826.0	90.10	180.80	9,707.8	-5,348.5	36.0	5,348.5	0.90	0.63	0.63
14,889.0	89.40	181.10	9,708.1	-5,411.5	35.0	5,411.5	1.21	-1.11	0.48
14,951.0	91.00	181.90	9,707.9	-5,473.5	33.4	5,473.5	2.89	2.58	1.29
15,014.0	91.20	182.30	9,706.7	-5,536.4	31.0	5,536.4	0.71	0.32	0.63
15,077.0	90.00	181.70	9,706.0	-5,599.4	28.8	5,599.3	2.13	-1.90	-0.95
15,140.0	90.80	182.50	9,705.6	-5,662.3	26.5	5,662.2	1.80	1.27	1.27
15,203.0	89.80	181.90	9,705.3	-5,725.3	24.1	5,725.1	1.85	-1.59	-0.95
15,266.0	88.30	181.20	9,706.3	-5,788.2	22.4	5,788.1	2.63	-2.38	-1.11
15,330.0	89.40	180.40	9,707.6	-5,852.2	21.5	5,852.0	2.13	1.72	-1.25
15,392.0	88.40	179.80	9,708.8	-5,914.2	21.4	5,914.0	1.88	-1.61	-0.97
15,456.0	90.00	178.50	9,709.7	-5,978.2	22.4	5,978.0	3.22	2.50	-2.03
15,519.0	89.50	177.00	9,709.9	-6,041.1	24.8	6,041.0	2.51	-0.79	-2.38
15,582.0	89.80	176.90	9,710.3	-6,104.0	28.2	6,103.9	0.50	0.48	-0.16
15,645.0	90.20	177.50	9,710.3	-6,167.0	31.3	6,166.9	1.14	0.63	0.95
15,707.0	89.50	177.00	9,710.5	-6,228.9	34.2	6,228.9	1.39	-1.13	-0.81
15,770.0	89.10	176.80	9,711.3	-6,291.8	37.6	6,291.8	0.71	-0.63	-0.32
15,824.0	90.10	177.30	9,711.6	-6,345.7	40.4	6,345.7	2.07	1.85	0.93
15,887.0	91.30	177.30	9,710.9	-6,408.6	43.4	6,408.7	1.90	1.90	0.00
15,949.0	90.90	177.60	9,709.7	-6,470.6	46.2	6,470.7	0.81	-0.65	0.48
16,012.0	90.30	177.50	9,709.0	-6,533.5	48.8	6,533.6	0.97	-0.95	-0.16
16,075.0	90.30	178.30	9,708.7	-6,596.5	51.2	6,596.6	1.27	0.00	1.27
16,138.0	90.10	178.20	9,708.5	-6,659.4	53.1	6,659.6	0.35	-0.32	-0.16
16,201.0	89.30	178.00	9,708.8	-6,722.4	55.2	6,722.6	1.31	-1.27	-0.32
16,265.0	89.10	178.30	9,709.7	-6,786.4	57.2	6,786.6	0.56	-0.31	0.47
16,328.0	88.60	176.90	9,711.0	-6,849.3	59.9	6,849.5	2.36	-0.79	-2.22
16,391.0	91.50	179.10	9,710.9	-6,912.2	62.1	6,912.5	5.78	4.60	3.49
16,454.0	91.20	178.10	9,709.4	-6,975.2	63.6	6,975.5	1.66	-0.48	-1.59
16,518.0	91.00	178.20	9,708.2	-7,039.2	65.7	7,039.4	0.35	-0.31	0.16
16,581.0	89.70	177.40	9,707.8	-7,102.1	68.1	7,102.4	2.42	-2.06	-1.27
16,644.0	88.60	177.00	9,708.7	-7,165.0	71.2	7,165.4	1.86	-1.75	-0.63
16,707.0	87.60	176.20	9,710.8	-7,227.9	74.9	7,228.3	2.03	-1.59	-1.27
16,771.0	86.90	176.10	9,713.9	-7,291.7	79.2	7,292.1	1.10	-1.09	-0.16

Company:	Slawson Exploration - RM	**Local Co-ordinate Reference:**	Well Lunker Federal 2-33-4H
Project:	Mountrail County, ND	**TVD Reference:**	WELL @ 1899.0usft (Cyclone #27)
Site:	Sec 33, T152N, R91W, 5th PM	**MD Reference:**	WELL @ 1899.0usft (Cyclone #27)
Well:	Lunker Federal 2-33-4H	**North Reference:**	True
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
16,833.0	89.20	176.10	9,716.0	-7,353.5	83.4	7,353.9	3.71	3.71	0.00
16,897.0	90.30	177.00	9,716.3	-7,417.4	87.3	7,417.9	2.22	1.72	1.41
16,958.0	92.60	177.60	9,714.7	-7,478.3	90.1	7,478.8	3.90	3.77	0.98
17,021.0	92.50	177.80	9,711.9	-7,541.2	92.7	7,541.7	0.35	-0.16	0.32
17,084.0	91.90	177.90	9,709.5	-7,604.1	95.0	7,604.7	0.97	-0.95	0.16
17,148.0	90.20	177.80	9,708.3	-7,668.0	97.4	7,668.6	2.66	-2.66	-0.16
17,211.0	88.50	177.10	9,709.1	-7,730.9	100.2	7,731.6	2.92	-2.70	-1.11
17,274.0	89.40	177.90	9,710.2	-7,793.9	103.0	7,794.5	1.91	1.43	1.27
17,338.0	89.30	177.60	9,710.9	-7,857.8	105.5	7,858.5	0.49	-0.16	-0.47
17,400.0	89.80	178.20	9,711.4	-7,919.8	107.8	7,920.5	1.26	0.81	0.97
17,464.0	89.50	178.40	9,711.8	-7,983.7	109.7	7,984.5	0.56	-0.47	0.31
17,526.0	88.90	178.80	9,712.7	-8,045.7	111.2	8,046.5	1.16	-0.97	0.65
17,590.0	90.20	178.90	9,713.2	-8,109.7	112.5	8,110.5	2.04	2.03	0.16
17,653.0	89.20	178.70	9,713.5	-8,172.7	113.8	8,173.5	1.62	-1.59	-0.32
17,716.0	89.70	178.90	9,714.1	-8,235.7	115.1	8,236.4	0.85	0.79	0.32
17,780.0	89.50	178.90	9,714.6	-8,299.6	116.3	8,300.4	0.31	-0.31	0.00
17,843.0	89.90	179.80	9,714.9	-8,362.6	117.0	8,363.4	1.56	0.63	1.43
17,906.0	89.50	179.90	9,715.2	-8,425.6	117.2	8,426.4	0.65	-0.63	0.16
17,968.0	88.70	179.50	9,716.2	-8,487.6	117.5	8,488.4	1.44	-1.29	-0.65
18,031.0	89.70	179.90	9,717.1	-8,550.6	117.9	8,551.4	1.71	1.59	0.63
18,095.0	89.20	179.60	9,717.7	-8,614.6	118.1	8,615.4	0.91	-0.78	-0.47
18,158.0	89.70	180.70	9,718.3	-8,677.6	118.0	8,678.4	1.92	0.79	1.75
18,222.0	89.40	181.30	9,718.8	-8,741.6	116.9	8,742.4	1.05	-0.47	0.94
18,284.0	90.20	180.80	9,719.0	-8,803.6	115.7	8,804.3	1.52	1.29	-0.81
18,347.0	89.40	178.80	9,719.2	-8,866.6	115.9	8,867.3	3.42	-1.27	-3.17
18,409.0	89.90	178.90	9,719.6	-8,928.6	117.2	8,929.3	0.82	0.81	0.16
18,472.0	89.50	177.30	9,719.9	-8,991.5	119.3	8,992.3	2.62	-0.63	-2.54
18,535.0	88.20	176.40	9,721.2	-9,054.4	122.7	9,055.2	2.51	-2.06	-1.43
18,599.0	90.90	178.70	9,721.7	-9,118.4	125.5	9,119.2	5.54	4.22	3.59
18,662.0	90.10	179.60	9,721.2	-9,181.3	126.4	9,182.2	1.91	-1.27	1.43
18,725.0	88.10	179.60	9,722.2	-9,244.3	126.8	9,245.2	3.17	-3.17	0.00
18,788.0	90.60	180.80	9,722.9	-9,307.3	126.6	9,308.2	4.40	3.97	1.90
18,851.0	92.80	180.30	9,721.0	-9,370.3	126.0	9,371.1	3.58	3.49	-0.79
18,914.0	92.10	180.00	9,718.3	-9,433.2	125.8	9,434.1	1.21	-1.11	-0.48
18,978.0	90.30	179.00	9,717.0	-9,497.2	126.4	9,498.0	3.22	-2.81	-1.56
19,041.0	89.40	178.90	9,717.1	-9,560.2	127.6	9,561.0	1.44	-1.43	-0.16
19,103.0	88.80	178.50	9,718.1	-9,622.2	129.0	9,623.0	1.16	-0.97	-0.65
19,166.0	87.40	178.20	9,720.2	-9,685.1	130.8	9,686.0	2.27	-2.22	-0.48
19,229.0	88.40	177.90	9,722.5	-9,748.0	132.9	9,748.9	1.66	1.59	-0.48
19,292.0	89.00	178.60	9,723.9	-9,811.0	134.8	9,811.9	1.46	0.95	1.11
19,355.0	88.30	178.50	9,725.4	-9,873.9	136.4	9,874.9	1.12	-1.11	-0.16
19,418.0	89.20	179.50	9,726.8	-9,936.9	137.5	9,937.9	2.14	1.43	1.59
19,482.0	89.10	179.60	9,727.7	-10,000.9	138.0	10,001.8	0.22	-0.16	0.16

Company:	Slawson Exploration - RM	**Local Co-ordinate Reference:**	Well Lunker Federal 2-33-4H
Project:	Mountrail County, ND	**TVD Reference:**	WELL @ 1899.0usft (Cyclone #27)
Site:	Sec 33, T152N, R91W, 5th PM	**MD Reference:**	WELL @ 1899.0usft (Cyclone #27)
Well:	Lunker Federal 2-33-4H	**North Reference:**	True
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
TD @ 19536' MD / 9729' TVD									
19,536.0	89.10	179.60	9,728.6	-10,054.9	138.4	10,055.8	0.00	0.00	0.00

Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
9,138.0	9,136.3	17.0	66.6	TIE IN @ 9138' MD / 9136' TVD
19,536.0	9,728.6	-10,054.9	138.4	TD @ 19536' MD / 9729' TVD

Checked By: _____ Approved By: _____ Date: _____

SUNDRY NOTICES AND REPORTS ON WELLS - FORM 4

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5749 (09-2006)

RECEIVED
NOV 2012
ND OIL & GAS DIVISION

Well File No.
23105

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

☑ Notice of Intent	Approximate Start Date: **November 14, 2012**	☐ Drilling Prognosis	☐ Spill Report
☐ Report of Work Done	Date Work Completed:	☐ Redrilling or Repair	☐ Shooting
☐ Notice of Intent to Begin a Workover Project that may Qualify for a Tax Exemption Pursuant to NDCC Section 57-51.1-03.	Approximate Start Date:	☐ Casing or Liner	☐ Acidizing
		☐ Plug Well	☐ Fracture Treatment
		☐ Supplemental History	☐ Change Production Method
		☐ Temporarily Abandon	☑ Reclamation
		☑ Other **Pit & surface Reclamation**	

Well Name and Number					
Lunker Federal 2-33-4H					
Footages	Qtr-Qtr	Section	Township	Range	
250 F N L 1200 F W L	**NWNW**	**27**	**152 N**	**91 W**	
Field	Pool	County			
VAN HOOK	**Bakken**	**Mountrail**			

24-HOUR PRODUCTION RATE

Before		After	
Oil	Bbls	Oil	Bbls
Water	Bbls	Water	Bbls
Gas	MCF	Gas	MCF

Name of Contractor(s)			
See Below			
Address	City	State	Zip Code

DETAILS OF WORK

Slawson Exploration Company, Inc. is panning to begin reclamation work on the reserve pit of this well. The surface owner is the State of North Dakota. Any oil in the pit will be skimmed off and used in Invert Mud for drilling other wells. The water will be disposed of by Slawson at various licensed Slawson injection facilities, such as the Sanish 1-9SWD. Once the fluids are removed the cuttings were dried and mixed with fly ash for stabilzation. The liner will then be folded over the stabilized cuttings in the pit and buried approximately 6 ft. deep with back fill and topsoil. The site will then re-seeded. This construction will be completed by one of the three following contractors pending availability.

1. **Gold Star Production Services, LLC, 6219, 39th Street NW, Plaza, ND, 58771**
2. **FMR Services Inc., 3767 County Road 99W, Orland, CA, 95963**
3. **W.L. Neu Construction, Inc., PO Box 461, Fairview, MT, 59221**

Company		Telephone Number
Slawson Exploration Company, Inc.		**720-457-9820**
Address		
1675 Broadway, Suite 1600		
City	State	Zip Code
Denver	**CO**	**80202**
Signature	Printed Name	
	Matt Glenn	
Title	Date	
Engineering Technician	**November 8, 2012**	
Email Address		
mglenn@slawsoncompanies.com		

FOR STATE USE ONLY

☐ Received	☒ Approved
Date	11-14-12
By	
Title	

SYNOPSIS

OPERATOR	Slawson Exploration Company Inc.
WELL NAME	Lunker Federal 2-33-4H
SURFACE LOCATION	250' FNL & 1200' FWL (NWNE) Section 33, T152N, R91W
BOTTOM HOLE LOCATION	253' FSL & 1347' FWL (SWSW) Section 4, T152N, R91E
FIELD	Van Hook
COUNTY/STATE	Mountrail Co., North Dakota
API NUMBER	33-061-02154
NorAm FILE NUMBER	NR2530
ELEVATIONS	**G.L.** = 1874.7' **K.B.** = 1998'
SPUD DATE	8/18/12
T.D. DATE	9/11/12
DRILLING CONTRACTOR	Cyclone Drilling, Rig 27
HOLE SIZE	13.33" to 1779' MD, 8.75" to 10045' MD, then 6" to 19536' MD
CASING SIZE & DEPTH	9 5/8" casing set at 1779' MD 7" casing set at 10035' MD
DRILLING MUD COMPANY	Geofluids
DRILLING FLUID TYPE	Diesel Oil Based Invert Mud (OBM)
DIRECTIONAL COMPANY	DDC
DRILLING SUPERVISION	George Ogden
GEOLOGICAL SUPERVISION	Calvin J. Hauser & Eric Schroeder & William Budd NorAm Wellsite Services
MUDLOGGING COMPANY	Nor Am Wellsite Services
TOTAL DEPTH	19536' MD

INDEX

FORMATION TOPS (ft)

KB = 1,899'

GL = 1,875'

FORMATION	PROGNOSIS			SAMPLES			LOGS		
	MD	TVD	SS	MD	TVD	SS	MD	TVD	SS
Pierre/ base Foxhills		1649	250						
Dakota (marine)		6688	-2789						
Dunham Salt		6006	-4107						
Base Dunham Sat		6076	-4177						
Pine Salt		6322	-4423						
Base Pine Salt		6359	-4460						
Opeche		6370	-4471						
Minnelussa		6640	-4471						
Kibbey Lime		7418	-5519						
Charles		7571	-5672	7576	7576	-5677	7576	7576	-5677
Base of Last Salt		8060	-6161	8064	8064	-6165	8064	8064	-6165
Mission Canyon		8238	-6339	8236	8236	-6337	8236	8236	-6337
Lodgepole		8843	-6994	8836	8836	-6937	8836	8836	-6937
Upper Bakken Shale		9659	-7760	9810	9646	-7747	9810	9646	-7747
Target Zone Top (Mbkmgr)		9687	-7788	9925	9677	-7778	9925	9677	-7778
Target		9697	-7798	9925	9683	-7784	9925	9683	-7784
Base of Target		9707	-7808	9925	9689	-7790	9925	9689	-7790

DEVIATION SURVEY RECORD (Teledrift and Wireline Data)

Depth	Incl	Azim	TVD	VS	Coordinates		DLS
(ft)	(?)	(?)	(ft)	(ft)	N/S (ft)	E/W (ft)	(?/100')
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
170	0.310	64.160	169.999	-0.196	0.200	0.414	0.182
262	0.620	76.640	261.996	-0.411	0.424	1.122	0.353
353	0.400	26.550	352.993	-0.801	0.822	1.743	0.523
445	0.400	38.060	444.991	-1.337	1.362	2.085	0.087
536	0.400	73.440	535.988	-1.672	1.703	2.585	0.267
625	0.220	230.450	624.988	-1.650	1.682	2.751	0.684
718	0.400	223.860	717.987	-1.306	1.335	2.388	0.197
810	0.310	151.830	809.985	-0.856	0.884	2.283	0.461
897	0.480	105.740	896.983	-0.545	0.577	2.745	0.398
987	0.790	60.030	986.978	-0.742	0.785	3.646	0.633
1078	0.79	73.83	1077.97	-1.216	1.273	4.792	0.209
1170	0.62	60.43	1169.963	-1.626	1.695	5.834	0.256
1262	0.62	65.44	1261.957	-2.068	2.148	6.719	0.059
1354	0.31	105.16	1353.954	-2.202	2.29	7.412	0.467
1446	0.4	72.47	1445.953	-2.227	2.321	7.959	0.237
1538	0.31	34.46	1537.951	-2.523	2.623	8.406	0.268
1632	0.22	105.34	1631.95	-2.681	2.785	8.724	0.336
1683	0.31	160.93	1682.95	-2.524	2.629	8.863	0.509
1727	0.4	161.77	1726.949	-2.264	2.371	8.95	0.205
1779	0.62	178.16	1778.947	-1.81	1.917	9.016	0.504
1858	1.1	176.36	1857.938	-0.625	0.733	9.078	0.608
1955	1.5	203.87	1954.913	1.46	-1.357	8.623	0.753
2044	1.58	210.37	2043.881	3.57	-3.481	7.531	0.216
2135	1.32	214.06	2134.852	5.506	-5.432	6.31	0.303
2229	0.79	185.76	2228.836	7.04	-6.974	5.639	0.775
2324	1.01	161.55	2323.825	8.488	-8.419	5.838	0.457
2423	1.71	129.55	2422.798	10.273	-10.188	7.253	1.018
2512	2.2	139.05	2511.746	12.434	-12.324	9.397	0.658
2605	2.42	112.33	2604.673	14.564	-14.418	12.383	1.17
2699	2.5	138.04	2698.589	16.88	-16.696	15.589	1.167
2795	1.1	153.55	2794.54	19.284	-19.078	17.4	1.531
2888	1.41	152.85	2887.518	21.112	-20.896	18.32	0.334
2984	1.71	153.77	2983.482	23.461	-23.232	19.492	0.314
3078	1.49	146.25	3077.445	25.751	-25.506	20.79	0.323
3172	1.01	151.35	3171.423	27.507	-27.249	21.867	0.524
3266	0.88	163.04	3265.41	28.931	-28.667	22.474	0.247
3360	0.62	150.96	3359.402	30.072	-29.802	22.932	0.322
3454	0.48	137.46	3453.398	30.812	-30.536	23.445	0.202
3549	0.5	109.47	3548.394	31.252	-30.968	24.105	0.25
3643	0.4	68.65	3642.392	31.277	-30.985	24.797	0.348

Depth	Incl	Azim	TVD	VS	Coordinates		DLS
(ft)	(?)	(?)	(ft)	(ft)	N/S (ft)	E/W (ft)	(?/100')
3737	0.31	87.45	3736.39	31.153	-30.854	25.357	0.155
3831	0.48	66.14	3830.388	30.99	-30.684	25.971	0.236
3924	0.31	55.24	3923.385	30.695	-30.383	26.534	0.199
4018	0.4	94.66	4017.384	30.583	-30.264	27.07	0.27
4112	0.4	107.14	4111.381	30.714	-30.388	27.71	0.093
4207	0.79	80.56	4206.376	30.716	-30.378	28.673	0.492
4301	1.1	65.13	4300.363	30.248	-29.892	30.131	0.424
4396	1.19	79.24	4395.345	29.701	-29.325	31.928	0.311
4489	1.49	115.23	4488.321	30.061	-29.66	33.97	0.942
4583	1.89	110.04	4582.28	31.143	-30.712	36.532	0.455
4678	0.79	93.74	4677.253	31.748	-31.291	38.657	1.214
4772	0.4	106.44	4771.247	31.894	-31.426	39.619	0.435
4865	0.48	92.07	4864.245	32.009	-31.532	40.319	0.146
4958	1.32	68.65	4957.233	31.649	-31.156	41.706	0.968
5052	2.02	62.36	5051.192	30.516	-29.994	44.182	0.769
5145	2.9	66.45	5144.106	28.859	-28.293	47.791	0.964
5238	2.5	65.13	5237.002	27.113	-26.5	51.788	0.435
5331	2.5	66.45	5329.914	25.494	-24.837	55.487	0.062
5425	1.89	54.94	5423.845	23.822	-23.127	58.636	0.798
5519	1.1	24.74	5517.813	22.131	-21.417	60.282	1.16
5613	1.1	359.04	5611.797	20.414	-19.696	60.645	0.52
5704	1.1	338.16	5702.78	18.726	-18.012	60.305	0.438
5799	1.41	324.36	5797.757	16.918	-16.215	59.285	0.454
5893	1.32	314.87	5891.731	15.197	-14.512	57.843	0.258
5991	1.49	313.95	5989.701	13.496	-12.831	56.126	0.175
6085	1.41	310.17	6083.671	11.881	-11.237	54.363	0.133
6180	1.32	322.87	6178.645	10.236	-9.61	52.809	0.331
6279	1.2	325.77	6277.621	8.455	-7.844	51.538	0.137
6369	0.79	328.54	6367.607	7.137	-6.536	50.684	0.459
6463	1.01	330.65	6461.595	5.853	-5.261	49.939	0.237
6555	0.79	0.75	6553.584	4.508	-3.92	49.55	0.558
6647	1.1	359.26	6645.572	2.991	-2.403	49.547	0.338
6740	1.1	8.97	6738.555	1.218	-0.628	49.675	0.2
6836	0.7	359.56	6834.543	-0.277	0.868	49.814	0.443
6930	0.79	341.63	6928.535	-1.469	2.057	49.605	0.264
7025	0.48	342.73	7023.529	-2.474	3.059	49.281	0.327
7119	0.62	339.13	7117.524	-3.329	3.91	48.983	0.153
7212	0.79	356.44	7210.518	-4.441	5.02	48.764	0.291
7300	0.79	341.94	7298.509	-5.626	6.202	48.538	0.227
7393	0.88	346.16	7391.499	-6.933	7.505	48.168	0.117
7492	0.7	347.17	7490.49	-8.265	8.833	47.852	0.182
7586	0.88	335.83	7584.481	-9.488	10.052	47.429	0.253

Depth	Incl	Azim	TVD	VS	Coordinates		DLS
(ft)	(?)	(?)	(ft)	(ft)	N/S (ft)	E/W (ft)	(?/100')
7675	0.7	8.84	7673.473	-10.651	11.212	47.233	0.54
7770	0.88	26.46	7768.464	-11.873	12.439	47.647	0.316
7868	0.88	41.84	7866.453	-13.097	13.673	48.484	0.24
7963	1.01	58.45	7961.44	-14.064	14.655	49.684	0.318
8056	0.88	72.16	8054.427	-14.695	15.303	51.063	0.279
8151	1.01	84.95	8149.414	-14.974	15.6	52.591	0.26
8245	0.88	86.14	8243.402	-15.078	15.721	54.137	0.14
8340	1.01	80.07	8338.389	-15.253	15.915	55.689	0.173
8434	1.01	87.76	8432.374	-15.408	16.09	57.333	0.144
8528	1.01	77.96	8526.36	-15.594	16.295	58.971	0.184
8622	0.79	89.43	8620.348	-15.756	16.474	60.429	0.301
8714	0.7	84.33	8712.34	-15.804	16.536	61.623	0.121
8808	0.79	90.75	8806.332	-15.838	16.584	62.842	0.13
8901	0.7	87.54	8899.324	-15.839	16.6	64.051	0.107
8990	0.48	83.46	8988.32	-15.894	16.666	64.964	0.252
9086	0.7	75.37	9084.315	-16.077	16.86	65.931	0.244
9138	0.79	72.95	9136.31	-16.25	17.05	66.58	
9169	0.8	94.8	9167.31	-16.30	17.09	67.00	1.0
9187	1.9	125.5	9185.30	-16.11	16.91	67.37	7.1
9200	3.2	135.2	9198.29	-15.72	16.53	67.80	10.5
9230	7.8	145.6	9228.14	-13.43	14.25	69.54	15.6
9260	12.1	146.1	9257.69	-9.10	9.96	72.45	14.3
9292	16.9	146.0	9288.66	-2.40	3.32	76.92	15.0
9323	20.8	150.6	9317.99	6.19	-5.22	82.14	13.5
9354	23.8	155.1	9346.67	16.73	-15.69	87.48	11.1
9385	27.0	160.8	9374.67	29.11	-28.01	92.43	13.0
9416	30.5	166.6	9401.85	43.46	-42.32	96.57	14.4
9448	33.8	171.7	9428.95	60.21	-59.03	99.74	13.3
9479	37.0	174.1	9454.22	78.05	-76.85	101.94	11.3
9510	41.1	175.3	9478.29	97.52	-96.29	103.74	13.4
9540	44.5	176.1	9500.29	117.86	-116.61	105.26	11.5
9571	47.2	176.0	9521.88	140.06	-138.80	106.79	8.7
9601	49.5	176.2	9541.82	162.44	-161.17	108.32	7.7
9633	52.8	176.0	9561.89	187.32	-186.03	110.01	10.3
9664	56.3	177.7	9579.87	212.54	-211.24	111.39	12.1
9695	59.2	179.5	9596.41	238.75	-237.44	112.03	10.6
9727	62.4	181.1	9612.02	266.68	-265.37	111.87	10.9
9758	65.3	181.4	9625.68	294.49	-293.19	111.27	9.4
9789	67.8	181.7	9638.02	322.90	-321.61	110.50	8.1
9821	70.0	181.3	9649.54	352.73	-351.46	109.72	7.0
9852	73.2	180.0	9659.32	382.14	-380.87	109.38	11.1
9882	75.7	179.1	9667.36	411.04	-409.76	109.61	8.8

Depth	Incl	Azim	TVD	VS	Coordinates		DLS
(ft)	(?)	(?)	(ft)	(ft)	N/S (ft)	E/W (ft)	(?/100')
9913	78.2	179.0	9674.36	441.23	-439.96	110.11	8.1
9944	80.9	179.6	9679.98	471.71	-470.44	110.49	8.9
9974	83.7	180.7	9684.00	501.44	-500.16	110.41	10.0
9993	85.4	181.3	9685.81	520.34	-519.07	110.08	9.5
10042	88.6	181.9	9688.37	569.23	-567.98	108.71	6.6
10079	88.2	181.5	9689.40	606.18	-604.95	107.61	1.5
10110	88.5	181.8	9690.30	637.15	-635.92	106.72	1.4
10174	91.3	182.0	9690.41	701.07	-699.88	104.60	4.4
10237	90.8	181.5	9689.25	764.01	-762.84	102.68	1.1
10300	91.3	181.4	9688.10	826.95	-825.81	101.08	0.8
10363	91.4	181.9	9686.62	889.88	-888.77	99.27	0.8
10426	89.9	181.7	9685.90	952.82	-951.73	97.29	2.4
10488	90.2	181.7	9685.85	1014.76	-1013.70	95.45	0.5
10551	89.1	181.1	9686.23	1077.72	-1076.68	93.91	2.0
10613	90.2	181.5	9686.61	1139.68	-1138.66	92.50	1.9
10676	89.7	180.7	9686.67	1202.65	-1201.65	91.29	1.5
10738	90.2	181.4	9686.72	1264.62	-1263.64	90.16	1.4
10801	89.9	181.1	9686.66	1327.58	-1326.62	88.78	0.7
10864	88.5	179.9	9687.54	1390.56	-1389.61	88.23	2.9
10927	89.9	180.6	9688.42	1453.55	-1452.60	87.96	2.5
10989	89.8	179.9	9688.59	1515.54	-1514.60	87.69	1.1
11052	89.0	179.6	9689.25	1578.53	-1577.60	87.96	1.4
11115	89.7	180.4	9689.96	1641.52	-1640.59	87.96	1.7
11177	89.6	180.4	9690.34	1703.51	-1702.59	87.53	0.2
11240	89.6	180.6	9690.78	1766.50	-1765.59	86.98	0.3
11303	89.2	180.4	9691.44	1829.48	-1828.58	86.43	0.7
11365	88.4	180.0	9692.74	1891.46	-1890.57	86.22	1.4
11428	87.3	179.6	9695.10	1954.41	-1953.52	86.43	1.9
11490	89.9	180.9	9696.62	2016.38	-2015.50	86.16	4.7
11553	90.2	181.5	9696.56	2079.34	-2078.48	84.84	1.1
11616	89.0	180.6	9697.00	2142.31	-2141.47	83.69	2.4
11678	90.2	181.7	9697.43	2204.27	-2203.45	82.45	2.6
11741	91.4	181.4	9696.55	2267.22	-2266.42	80.74	2.0
11804	88.3	179.6	9696.72	2330.20	-2329.41	80.19	5.7
11866	90.2	180.0	9697.53	2392.18	-2391.40	80.41	3.1
11929	90.3	179.5	9697.26	2455.18	-2454.40	80.68	0.8
11992	89.9	177.5	9697.15	2518.17	-2517.37	82.33	3.2
12054	89.9	176.7	9697.25	2580.13	-2579.29	85.47	1.3
12118	90.1	176.6	9697.25	2644.06	-2643.18	89.21	0.3
12181	88.2	176.2	9698.19	2706.96	-2706.05	93.16	3.1
12243	89.9	177.9	9699.22	2768.90	-2767.95	96.35	3.9
12307	90.6	178.9	9698.94	2832.89	-2831.93	98.14	1.9

Depth	Incl	Azim	TVD	VS	Coordinates		DLS
(ft)	(?)	(?)	(ft)	(ft)	N/S (ft)	E/W (ft)	(?/100')
12370	89.8	178.5	9698.72	2895.89	-2894.91	99.57	1.4
12432	89.1	177.5	9699.31	2957.87	-2956.87	101.73	2.0
12496	92.5	179.6	9698.42	3021.84	-3020.83	103.35	6.2
12559	92.5	179.8	9695.67	3084.78	-3083.77	103.68	0.3
12622	90.0	178.9	9694.30	3147.76	-3146.74	104.40	4.2
12684	90.9	179.5	9693.81	3209.76	-3208.73	105.26	1.7
12747	91.4	179.9	9692.54	3272.74	-3271.72	105.59	1.0
12810	89.2	179.5	9692.22	3335.74	-3334.71	105.92	3.5
12873	88.7	179.2	9693.37	3398.73	-3397.70	106.64	0.9
12936	90.3	180.7	9693.92	3461.72	-3460.69	106.69	3.5
12999	89.8	180.5	9693.86	3524.70	-3523.69	106.03	0.9
13062	89.5	180.6	9694.25	3587.68	-3586.69	105.43	0.5
13126	90.1	181.3	9694.47	3651.66	-3650.68	104.37	1.4
13189	90.3	181.9	9694.25	3714.61	-3713.65	102.61	1.0
13252	90.1	181.8	9694.03	3777.54	-3776.62	100.57	0.4
13315	91.0	182.9	9693.43	3840.45	-3839.56	97.99	2.3
13378	88.3	182.2	9693.81	3903.34	-3902.49	95.19	4.4
13441	89.5	182.9	9695.02	3966.23	-3965.41	92.39	2.2
13505	89.4	182.9	9695.64	4030.10	-4029.33	89.15	0.2
13568	90.1	184.0	9695.91	4092.94	-4092.21	85.36	2.1
13632	89.8	184.1	9695.97	4156.72	-4156.05	80.84	0.5
13695	88.8	183.5	9696.74	4219.52	-4218.91	76.66	1.9
13758	89.6	184.5	9697.62	4282.30	-4281.75	72.27	2.0
13821	90.1	185.4	9697.78	4345.00	-4344.51	66.83	1.6
13884	88.4	183.8	9698.61	4407.72	-4407.30	61.78	3.7
13948	88.9	184.6	9700.11	4471.47	-4471.11	57.09	1.5
14010	87.4	183.6	9702.12	4533.22	-4532.92	52.66	2.9
14073	89.8	183.8	9703.65	4596.01	-4595.76	48.60	3.8
14135	88.0	182.6	9704.84	4657.86	-4657.65	45.14	3.5
14198	90.1	182.2	9705.89	4720.75	-4720.58	42.50	3.4
14261	91.4	181.6	9705.06	4783.68	-4783.54	40.41	2.3
14325	89.4	179.8	9704.62	4847.66	-4847.53	39.63	4.2
14387	89.6	179.9	9705.16	4909.65	-4909.52	39.79	0.4
14450	89.7	180.4	9705.54	4972.64	-4972.52	39.63	0.8
14512	89.2	180.4	9706.14	5034.63	-5034.52	39.20	0.8
14575	89.4	181.5	9706.91	5097.60	-5097.50	38.15	1.8
14637	89.2	180.0	9707.67	5159.57	-5159.49	37.34	2.4
14700	90.5	180.4	9707.83	5222.56	-5222.49	37.12	2.2
14763	89.7	180.4	9707.72	5285.55	-5285.49	36.68	1.3
14826	90.1	180.8	9707.83	5348.54	-5348.48	36.02	0.9
14889	89.4	181.1	9708.11	5411.51	-5411.47	34.98	1.2
14951	91.0	181.9	9707.89	5473.46	-5473.45	33.35	2.9

Depth	Incl	Azim	TVD	VS	Coordinates		DLS
(ft)	(?)	(?)	(ft)	(ft)	N/S (ft)	E/W (ft)	(?/100')
15014	91.2	182.3	9706.68	5536.38	-5536.40	31.04	0.7
15077	90.0	181.7	9706.02	5599.30	-5599.35	28.85	2.1
15140	90.8	182.5	9705.58	5662.22	-5662.31	26.54	1.8
15203	89.8	181.9	9705.25	5725.14	-5725.26	24.12	1.9
15266	88.3	181.2	9706.30	5788.08	-5788.23	22.42	2.6
15330	89.4	180.4	9707.58	5852.05	-5852.21	21.52	2.1
15392	88.4	179.8	9708.77	5914.03	-5914.19	21.41	1.9
15456	90.0	178.5	9709.66	5978.02	-5978.18	22.36	3.2
15519	89.5	177.0	9709.94	6040.99	-6041.12	24.84	2.5
15582	89.8	176.9	9710.32	6103.94	-6104.03	28.19	0.5
15645	90.2	177.5	9710.32	6166.90	-6166.96	31.27	1.1
15707	89.5	177.0	9710.49	6228.85	-6228.89	34.24	1.4
15770	89.1	176.8	9711.26	6291.79	-6291.79	37.65	0.7
15824	90.1	177.3	9711.63	6345.75	-6345.72	40.43	2.1
15887	91.3	177.3	9710.86	6408.70	-6408.64	43.39	1.9
15949	90.9	177.6	9709.67	6470.66	-6470.57	46.15	0.8
16012	90.3	177.5	9709.01	6533.63	-6533.51	48.84	1.0
16075	90.3	178.3	9708.68	6596.60	-6596.46	51.15	1.3
16138	90.1	178.2	9708.46	6659.59	-6659.43	53.08	0.4
16201	89.3	178.0	9708.79	6722.58	-6722.40	55.17	1.3
16265	89.1	178.3	9709.69	6786.56	-6786.36	57.23	0.6
16328	88.6	176.9	9710.95	6849.51	-6849.29	59.87	2.4
16391	91.5	179.1	9710.90	6912.49	-6912.24	62.07	5.8
16454	91.2	178.1	9709.41	6975.46	-6975.20	63.61	1.7
16518	91.0	178.2	9708.18	7039.44	-7039.16	65.67	0.3
16581	89.7	177.4	9707.80	7102.41	-7102.11	68.09	2.4
16644	88.6	177.0	9708.73	7165.36	-7165.02	71.17	1.9
16707	87.6	176.2	9710.82	7228.26	-7227.88	74.90	2.0
16771	86.9	176.1	9713.89	7292.08	-7291.66	79.19	1.1
16833	89.2	176.1	9716.00	7353.95	-7353.47	83.41	3.7
16897	90.3	177.0	9716.28	7417.87	-7417.36	87.26	2.2
16958	92.6	177.6	9714.74	7478.81	-7478.26	90.13	3.9
17021	92.5	177.8	9711.93	7541.72	-7541.15	92.66	0.4
17084	91.9	177.9	9709.52	7604.65	-7604.06	95.02	1.0
17148	90.2	177.8	9708.34	7668.62	-7668.00	97.42	2.7
17211	88.5	177.1	9709.06	7731.58	-7730.93	100.22	2.9
17274	89.4	177.9	9710.21	7794.53	-7793.86	102.97	1.9
17338	89.3	177.6	9710.94	7858.51	-7857.81	105.48	0.5
17400	89.8	178.2	9711.43	7920.48	-7919.76	107.75	1.3
17464	89.5	178.4	9711.82	7984.47	-7983.73	109.65	0.6
17526	88.9	178.8	9712.68	8046.46	-8045.71	111.17	1.2
17590	90.2	178.9	9713.18	8110.46	-8109.69	112.45	2.0

Depth	Incl	Azim	TVD	VS	Coordinates		DLS
(ft)	(?)	(?)	(ft)	(ft)	N/S (ft)	E/W (ft)	(?/100')
17653	89.2	178.7	9713.51	8173.45	-8172.68	113.77	1.6
17716	89.7	178.9	9714.12	8236.45	-8235.66	115.09	0.9
17780	89.5	178.9	9714.57	8300.44	-8299.65	116.32	0.3
17843	89.9	179.8	9714.90	8363.44	-8362.64	117.03	1.6
17906	89.5	179.9	9715.23	8426.44	-8425.64	117.20	0.7
17968	88.7	179.5	9716.20	8488.43	-8487.63	117.52	1.4
18031	89.7	179.9	9717.08	8551.42	-8550.62	117.85	1.7
18095	89.2	179.6	9717.69	8615.41	-8614.62	118.13	0.9
18158	89.7	180.7	9718.30	8678.40	-8677.61	117.97	1.9
18222	89.4	181.3	9718.80	8742.37	-8741.60	116.85	1.0
18284	90.2	180.8	9719.02	8804.34	-8803.59	115.71	1.5
18347	89.4	178.8	9719.24	8867.34	-8866.59	115.93	3.4
18409	89.9	178.9	9719.62	8929.33	-8928.57	117.18	0.8
18472	89.5	177.3	9719.95	8992.32	-8991.54	119.27	2.6
18535	88.2	176.4	9721.21	9055.24	-9054.43	122.73	2.5
18599	90.9	178.7	9721.71	9119.20	-9118.35	125.46	5.5
18662	90.1	179.6	9721.16	9182.20	-9181.34	126.40	1.9
18725	88.1	179.6	9722.15	9245.19	-9244.33	126.84	3.2
18788	90.6	180.8	9722.87	9308.17	-9307.32	126.62	4.4
18851	92.8	180.3	9721.00	9371.12	-9370.29	126.01	3.6
18914	92.1	180.0	9718.31	9434.06	-9433.23	125.85	1.2
18978	90.3	179.0	9716.97	9498.04	-9497.21	126.41	3.2
19041	89.4	178.9	9717.13	9561.04	-9560.20	127.56	1.4
19103	88.8	178.5	9718.10	9623.03	-9622.17	128.97	1.2
19166	87.4	178.2	9720.19	9685.98	-9685.11	130.78	2.3
19229	88.4	177.9	9722.50	9748.92	-9748.03	132.92	1.7
19292	89.0	178.6	9723.93	9811.89	-9810.98	134.85	1.5
19355	88.3	178.5	9725.41	9874.87	-9873.95	136.44	1.1
19418	89.2	179.5	9726.79	9937.85	-9936.92	137.54	2.1
19482	89.1	179.6	9727.74	10001.85	-10000.91	138.04	0.2
19536	89.1	179.6	9728.59	10055.84	-10054.90	138.42	0.0

BIT RECORD

BIT #	TYPE	SIZE (IN)	IN (FT)	OUT (FT)	TOTAL (FT)	HOURS DRLG	WOB (K)	RPM	Comments
1	S117G	13.5	109	1779	1670	24.5			Vertical Borehole
2	Hughes/PDC	8.75	1779	7500	5721	40			Vertical Borehole
3	Hughes/ DP506X	8.75	7500	9195	1695	27.5			Vertical Borehole
4	Hughes/ DP505F	8.75	9195	10045	850	22			Curve Building Drilling
5	Halliburton/ FX55D	6	10045	15838	5793	158			Horizontal Borehole
6	SEC/FX55D	6	15838	19538	3698	98.5			Horizontal Borehole

DRILLING FLUID PARAMETERS

DATE	WT	VIS	PV	YP	HTHP	% SOL	Oil/H2O Ratio	NaCL
08/22/12	10.0	57	12	9	15	10.79	83/17	42000
08/23/12	10.2	59	15	9	15	11.66	82/18	38000
08/24/12	10.0	67	22	14	15	10.84	79/21	46000
08/25/12	10.4	80	20	13	15	12.97	79/21	48000
08/26/12	10.1	76	24	16	15	11.84	78/22	47000
08/27/12	9.9	77	24	17	15	10.84	79/21	49000
08/28/12 No Mud Report								
08/29/12	10.1	84	24	17	15	11.84	78/22	47000
08/30/12	10.1	74	27	18	15	11.97	80/20	50000
08/31/12	10.0	69	24	18	14.2	10.94	80/20	49000
09/01/12	10.0	78	24	18	14	10.84	80/20	51000
09/02/12	10.1	80	26	20	13.8	10.97	80/20	49000
09/03/12	10.1	74	24	14	13.4	11.10	81/19	46000
09/04/12	10.1	71	23	15	13	11.22	82/18	45000
09/05/12	10.0	70	19	16	12.8	11.97	81/19	44000
09/06/12	10.2	72	20	17	12.8	14.10	80/20	44000
09/07/12	10.3	79	21	17	12.56	12.81	80/20	44000
09/08/12	10.3	77	18	14	12.6	12.48	85/15	44000
09/09/12	10.2	67	18	15	12.8	13.22	82/18	40000
09/10/12	10.3	76	18	21	12.8	13.86	82/18	38000
09/11/12	10.4	76	23	23	12.8	14.05	86/14	38000

DAILY DRILLING CHRONOLOGY

DATE (m/d/y)	DEPTH @ 24.00	PROGRESS (ft/24 hours)	BREAKDOWN 00:00 – 24:00	RIG ACTIVITY
08/18/12	151'	0'	24:00-05:30	Drill from 151'-690'
			05:30-06:00	Lubricate Rig
			06:00-16:00	Drill from 690'-1405'
			16:00-16:30	Lubricate Rig
			16:30-18:00	Drill from 1405'-1589'
			18:00-21:00	Drill from 1589'-1734'
			21:00-21:30	Circulate
			21:30-24:00	Wiper Trip to Bit
08/19/12	1734'	1583'	24:00-01:30	Wiper Trip to Bit
			01:30-02:30	Drill from 1734'-1779'
			02:30-03:00	Circulate
			03:00-03:30	Lubricate Rig
			03:30-05:00	TOOH for Casing
			05:00-06:00	L/D 3 8" DC. UBHO, 2 Monels, Bit, and Bit Sub
			06:00-07:00	Clean Floor, wait on CSG Crew
			07:00-08:00	Hold Safety Meeting and Rig Up CSG Crew
			08:00-10:00	Run Casing
			10:00-11:00	Rig Down Casing Crew and Circulate
			11:00-11:30	Hold Safety Meeting and Rig Up Cementers
			11:30-14:00	Cement, R/D Cementers
			14:00-16:30	Break and Clean Flow Line & Conditioner, Clean Cellar
			16:30-18:00	Cut Off Conductor and Casing
			18:00-20:00	Weld Well Head, Test 1500PSI for 15min
			20:00-24:00	Nipple up BOP Choke Line, Kill Line
08/20/12	1779'	45'	00:00-01:30	Nipple up BOP Choke Line, Kill Line
			01:30-06:00	Test BOP, Held Safety Meeting w/ Pathfinder. Test IBOP, Mud Line, HCR, Pipe Rams,
			06:00-09:00	Nipple Up Rot Head, Flow Lines, Turn Buckles, CK Coms and Breaks, Flare Lines
			09:00-12:30	Repair Rig, Wait for and Install Koomey Parts

DATE (m/d/y)	DEPTH @ 24.00	PROGRESS (ft/24 hours)	BREAKDOWN 00:00 – 24:00	RIG ACTIVITY
			12:30-13:00	Lubricate Rig
			13:00-18:00	Test BOP
			18:00-19:00	Test Blind Rams
			19:00-20:00	Install Wear Bushing
			20:00-24:00	Clean Mud Tanks and Mud Trofts
08/21/12	1779'	0'	00:00-03:00	Clean Mud Tanks and Mud Trofts
			03:00-05:00	Transfer Invert to Mud Tanks
			05:00-06:00	P/U BHA, Bit, Motor, M and Monel
			06:00-08:00	Trips RIH to 1675' Tagged Cement @ 1675'
			08:00-09:30	DRLG Cement from 1675'-1779'
			09:30-10:00	Fit Test
			10:00-16:00	Drill from 1789'-3319'
			16:00-16:30	Lubricate Rig
			16:30-18:00	Drill from 3319'-3789'
			18:00-24:00	Drill from 3789'-5291'
08/22/12	5291'	3512'	00:00-00:30	Lubricate Rig
			00:30-06:00	Drill from 5291'-5945'
			06:00-15:00	Drill from 5945'-6794'
			15:00-15:30	Lubricate Rig
			15:30-18:00	Drill from 6794'-6900'
			18:00-24:00	Drill from 6900'-7176'
08/23/12	7176'	1885'	00:00-02:00	Drill from 7176'-7451'
			02:00-02:30	Lubricate Rig
			02:30-04:00	Drill from 7451'-7500'
			04:00-05:00	Condition Mud and Circulate Pump Slug
			05:00-06:00	TOOH for Bit
			06:00-10:00	TOOH for Bit
			10:00-14:30	TIH. Filled Pipe @ 1927' and 4770'
			14:30-16:30	Drill from 7500'-7639'
			16:30-17:00	Lubricate Rig
			17:00-18:00	Drill from 7639'-7732'
			18:00-24:00	Drill from 7732'-8120'
8/24/12	8120'	944'	00:00-04:00	Drill from 8120'-8391'
			04:00-04:30	Lubricate Rig
			04:30-06:00	Drill from 8391'-8482'
			06:00-14:30	Drill from 8482'-8990'
			14:30-15:00	Lubricate Rig

DATE (m/d/y)	DEPTH @ 24.00	PROGRESS (ft/24 hours)	BREAKDOWN 00:00 – 24:00	RIG ACTIVITY
			15:00-18:00	Drill from 8990'-9138'
			18:00-18:30	Lubricate Rig
			18:30-20:00	Drill from 9138'-9195'
			20:00-21:00	Condition Mud, Circulate, Build Dry Job
			21:00-22:00	TOOH to 7400' for Short Trip
			22:00-22:30	TIH
			22:30-23:30	Condition Mud, Circulate, Build Dry Job
			23:30-24:00	TOOH to Pick up Dir. Tools
8/25/12	9195'	1075'	00:00-06:00	TOOH to Pick up Dir. Tools
			06:00-06:30	Lay Down Bit, Motor and Monel
			06:30-07:00	Lubricate Rig
			07:00-08:00	Wait on Loggers
			08:00-12:30	Safety Meeting w/ Loggers, Rig Up Weatherford and Log
			12:30-14:30	Dir. Work, P/U and Orient Directional Tools, RIH w/ Monels and Test MWD
			14:30-18:00	TIH
			18:00-19:00	Finish TIH
			19:00-24:00	Log Gamma From 8819'-9146'
8/26/12	9195'	0'	00:00-00:30	Log Gamma From 8819'-9146'
			00:30-01:00	Lubricate Rig
			01:00-06:00	Drill from 9187'-9221'
			06:00-17:00	Drill from 9221'-9499'
			17:00-17:30	Lubricate Rig
			17:30-18:00	Drill from 9499'-9525'
			18:00-24:00	Drill from 9525'-9685'
8/27/12	9685'	490'	00:00-02:00	Drill from 9685'-9747'
			02:00-02:30	Lubricate Rig
			02:30-06:00	Drill from 9747'-9841'
			06:00-11:30	Drill from 9841'-10045'
			11:30-12:30	Condition Mud and Circulate
			12:30-13:30	Shot Trip to 9187'
			13:30-14:00	Lubricate Rig
			14:00-17:30	Condition Mud and Circulate , Pump Dry Job
			17:30-18:00	Safety Meeting w/ Lay Down Crew, Rig Up and LDDP
			18:00-24:00	Held Safety Meeting w/ Lay Down Crew, LDDP. Collars, HW, Monel, MWD, Motor and Bit

DATE (m/d/y)	DEPTH @ 24.00	PROGRESS (ft/24 hours)	BREAKDOWN 00:00 – 24:00	RIG ACTIVITY
8/28/12	10045'	360'	00:00-03:00	Held Safety Meeting w/ Lay Down Crew, LDDP. Collars, HW, Monel, MWD, Motor and Bit
			03:00-03:30	Pull Wear Bushing
			03:30-05:00	Rig Up to Run Casing
			05:00-06:00	Make Up Shoe Track, Float Collar and Test Floats, Run Casing
			06:00-13:00	Run Casing, Filled CSG @ 800', 2800', 4800', 6800', 8750' and 9700'
			13:00-16:30	Condition Mud and Circulate
			16:30-17:00	Lubricate Rig
			17:00-18:00	Safety Meeting w/ Halliburton and Cement 7" CSG
			18:00-21:00	Cement 7" CSG
			21:00-24:00	R/D Halliburton, Install Wear Bushing w/ Pack Off
8/29/12	10045'	0'	00:00-04:00	Nipple up BOP, Change Out Pipe Rams, Manual IBOP, Backup Grippers Stabbing Guide
			04:00-06:00	Test BOP, Attempted to Install XO's and Test Plug, Unable to Shut Pipe Rams, L/D XO's and Test Plug, Install Cup Plug and Attempt to Test
			06:00-13:00	Test BOP, Troubleshoot PSI Loss, Loose Pack Off Nut, Change Coupling, Blind Rams, Cameron Delivered Wrong Test Plug, Retest Annular
			13:00-14:30	Dir. Work, P/U Bit, Motor, Directional Tools, Reamer and 3 JTS HWDP
			14:30-18:00	R/U Laydown Machine and Casers Tongs and RIH w/ 4" Pipe
			18:00-23:30	P/U 4" Drill Pipe and Fill @ 4000' and 6800'. Tagged Cement @ 9873'
			23:30-24:00	BRK Circulation, R/D CSG Crew
8/30/12	10045'	0'	00:00-00:30	BRK Circulation, R/D CSG Crew

DATE (m/d/y)	DEPTH @ 24.00	PROGRESS (ft/24 hours)	BREAKDOWN 00:00 – 24:00	RIG ACTIVITY
			00:30-01:30	Cut Off Drilling Line, 98'
			01:30-04:30	Drill Out Cement Float @ 9956' and Shoe @ 10035'
			04:30-06:00	Drill from 10045'-10101'
			06:00-15:30	Drill from 10101'-10635'
			15:30-16:00	Lubricate Rig
			16:00-18:00	Drill from 10635'-10762'
			18:00-24:00	Drill from 10762'-10988'
8/31/12	11200'	1155'	00:00-04:00	Drill from 10988'-11200'
			04:00-04:30	Lubricate Rig
			04:30-06:00	Drill from 11200'-11294'
			06:00-16:30	Drill from 11294'-11764'
			16:30-17:00	Lubricate Rig
			17:00-18:00	Drill from 11764'-11827'
			18:00-24:00	Drill from 11827'-12008'
9/1/12	12008'	808'	00:00-05:00	Drill from 12008'-12140'
			05:00-05:30	Lubricate Rig
			05:30-06:00	Drill from 12140'-12172'
			06:00-14:00	Drill from 12172'-12424'
			14:00-14:30	Lubricate Rig
			14:30-18:00	Drill from 12424'-12518'
			18:00-22:30	Drill from 12518'-12636'
			22:30-23:00	Lubricate Rig
			23:00-24:00	Drill from 12636'-12659'
9/2/12	12659'	651'	00:00-06:00	Drill from 12659'-12864'
			06:00-15:30	Drill from 12864'-13275'
			15:30-16:00	Lubricate Rig
			16:00-18:00	Drill from 13275'-13369'
			18:00-24:00	Drill from 13369'-13559'
9/3/12	13559'	900'	00:00-05:00	Drill from 13559'-13717'
			05:00-05:30	Lubricate Rig
			05:30-06:00	Drill from 13717'-13749'
			06:00-15:30	Drill from 13749'-14033'
			15:30-16:00	Lubricate Rig
			16:00-18:00	Drill from 14033'-14055'
			18:00-24:00	Drill from 14055'-14220'
9/4/12	14220'	661'	00:00-00:30	Lubricate Rig
			00:30-06:00	Drill from 14220'-14379'
			06:00-16:00	Drill from 14379'-14691'
			16:00-16:30	Lubricate Rig
			16:30-18:00	Drill from 14691'-14740'
			18:00-24:00	Drill from 14740'-14930'

DATE (m/d/y)	DEPTH @ 24.00	PROGRESS (ft/24 hours)	BREAKDOWN 00:00 – 24:00	RIG ACTIVITY
9/5/12	14930'	710'	00:00-01:30	Drill from 14930'-14974'
			01:30-02:00	Lubricate Rig
			02:00-06:00	Drill from 14974'-15102'
			06:00-16:00	Drill from 15102'-15352'
			16:00-16:30	Lubricate Rig
			16:30-18:00	Drill from 15,352'-15,400'
			18:00-24:00	Drill from 15,400'-15,513'
9/6/12	15,513'	583'	00:00-04:00	Drill from 15,513'-15,593'
			04:00-04:30	Lubricate Rig
			04:30-05:00	Work on Mud Pumps
			05:00-06:00	Drill from 15,593'-15,636'
			06:00-13:30	Drill from 15,636'-15,838'
			13:30:14:30	Circulate Dry Job
			14:30-18:00	TOOH for Mud Motor & Bit
			18:00-21:30	TOOH from 9600 for Bit & MTR
			21:30-24:00	Work MTR, BIT, MWD, Blind Rams
9/7/12	15,838'	325'	00:00-04:00	T.I.H. 42 Stands make up Shock Sub, Agitator & Fill @ 4,200', 7,064'
			04:00-04:30	Fill @ 10,095' & Test Tool
			04:30-06:00	Slip & Cut 24 Wraps @ 180'
			06:00-08:00	T.I.H. TGSM CHK C.O.M. & BRKS LB
			08:00-09:00	Wash & Ream from 15,658'-15,838'
			09:00-09:30	Circulate Gas through Buster
			09:30-15:00	Drill from 15,838'-16,066'
			15:00-15:30	Attempt different pump rates
			15:30-16:30	Drill from 16,066'-16,129'
			16:30-17:00	Lubricate Rig
			17:00-18:00	Drill from 16,129'-16,160'
			18:00-24:00	Drill from 16,160 – 16,419'
9/8/12	16,419'	581'	00:00-05:00	Drill from 16,419 – 16,698'
			05:00-05:30	Lubricate Rig
			05:30-06:00	Drill from 16698-16730
			06:00-07:00	Drill from 16,730' – 16793'
			07:00-07:30	Change out ROT head rubber
			07:30-11:30	Drill from 16,793' – 16,887'
			11:30-12:00	Lubricate Rig
			12:00-18:00	Drill from 16,887' – 17,170'
			18:00-24:00	Drill from 17,170' – 17,400'

DATE (m/d/y)	DEPTH @ 24.00	PROGRESS (ft/24 hours)	BREAKDOWN 00:00 – 24:00	RIG ACTIVITY
9/9/12	17,400'	981'	00:00-03:00	Drill from 17,400' – 17,549'
			03:00-03:00	Lubricate Rig
			03:30-06:00	Drill from 17,549' – 17,612'
			06:00-16:30	Drill from 17,612' – 18,117'
			16:30-17:00	Lubricate Rig
			17:00-18:00	Drill from 18,117' – 18,149'
			18:00-24:00	Drill from 18,149' – 18,400'
9/10/12	18,400'	1000'	00:00-04:00	Drill from 18,400' – 18,495'
			04:00-04:30	Lubricate Rig
			04:30-06:00	Drill from 18,495' – 18,558'
			06:00-14:30	Drill from 18,558' – 18,779'
			14:30-15:00	Lubricate Rig
			15:00-18:00	Drill from 18,779' – 18,840'
			18:00-24:00	Drill from 18,840' – 18,993'
9/11/12	18,993'	593'	00:00-04:00	Drill from 18,993' – 19,157'
			04:00-04:30	Lubricate Rig
			04:30-06:00	Drill from 19,157' – 19,220'
			06:00-06:30	Drill from 19,220' – 19,225'
			06:30-07:00	Lubricate Rig
			07:00-17:30	Drill from 19,225' – 19,536'
			17:30-18:00	Circulate & Work pipe, Build dry job
			18:00-20:30	Circulate & Pump Pill
			20:30	TOOH 101 Stands to 9997

TOTAL GAS DATA

SHOW INTERVAL FROM – TO (ft)	BKGD UNITS	SHOW UNITS	BRIEF DESCRIPTION (Rock type, porosity, visual show, etc.)
9063 – 9080' MD	60 (in)-0 230 (out)	1580	9060-9090' LS: gy med dk gy, mnr lt cream tan, mcxln, cxyln ip, mod hrd, brit ip, sub blky, sl arg, tt, p intergran por, dull spotty lt sl yel wh fluor, dull lt wh diffuse cut, wh lt yel to weak lt grn ring (possible fractures ?)
9704 – 9719' MD	40 (in) –70 (out)	254	LS: med dk gy, lt gy, tan, tr mnr lt cream, cxyln - mcxyln, mod hrd, brit ip, sub blky, sl arg, tt, p intergran por, dull spotty lt sl yel wh fluor, dull lt wh diffuse cut, wh lt yel to weak lt grn ring (possible gas leakage from Mbku)
9798 – 9809' MD	70 (in)	2000	LS: med dk gy, lt gy, tan, tr mnr lt cream, cxyln - mcxyln, mod hrd, brit ip, sub blky, arg, tt, p intergran por, spotty lt wh sl yel fnt lt gn fluor, bri wh sl lt yel diffuse cut, bri wh to lt yel to lt grn ring (gas trapped between Mlfb & Mbku)
9810 – 9875' MD	750	3613 (peak) 1800 (avg.)	SH: drk blk, wxy, firm, non calc, greasy, petrolif, tt, por intrxtln por, sptty lt yel sl lt grn flor, lt wh diff cut, fst bri wh sl yel strms, bri wh - sl yel lt gn ring
9925 – 9993' MD	700	900 (peak) 750 (avg.)	SILTY LS/ ARGILLACEOUS SILTY LS: med gy, lt gy, mcxln, suc ip, firm to mod hard, mod strng weak arg ip, tr o stain, tt, por intrxtln por, sptty lt yel wh sl grn flor, mod fst wh blmg diff cut, fst wh strms, bri wh - sl yel lt gn ring

LITHOLOGY

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION

30' Samples Caught by Rig Crews

7500-7530'	MUDSTONE/SILTSTONE: MUDSTONE; red, silty, firm, sticky in part, SILTSTONE; red, muddy, firm, sticky, trace black shaley partings
7530-7560'	SHALE: brick red, amber tan red, silt rich in to part, sub-blocky, soft, ANHYDRITE to MUDSTONE; red, silty, firm, sticky in-part, SILTSTONE; red, muddy, firm, sticky, trace black shaley partings
7560-7590'	ANHYDRITE; light tan, tan, off white, moderately soft to firm, SALT; clear, semi translucent, brittle, firm, massive, SHALE; brick red, silt rich in part, trace black shale partings

Mc at 7576' MD

7590-7620'	SALT; clear, semi translucent, brittle, firm, massive, trace off white anhydrite, trace brick red shale
7620-7650'	MUDSTONE/SALT/ANHYDRITE: MUDSTONE; light gray, ANHYDRITE; off white, tan, soft, SALT; clear, semi translucent, brittle in part, massive in part, some brick red shale partings

Mb6s at 7635' MD

M5s at 7646' MD

7650-7680'	MUDSTONE/SALT/ANHYDRITE: MUDSTONE; light gray, moderately dark gray, ANHYDRITE; off white, tan, soft, SALT; clear, semi translucent, brittle in part, massive in part, abundant brick red shale partings

Mb5s at 7661' MD

7680-7710'	ANHYDRITE/MUDSTONE to: ANHYDRITE; off white, tan, very soft, sticky in part, MUDSTONE; light gray, medium dark gray, moderately hard, trace brick red shale partings

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
7710-7740'	ANHYDRITE/MUDSTONE: ANHYDRITE; off white, tan, very soft, sticky in part, MUDSTONE; light gray, medium dark gray, moderately hard, trace brick red shale partings, trace salt
7740-7770'	ANHYDRITE; off white, tan, very soft, sticky in part, trace salt
	Mb3s at 7745' MD
7770-7800'	SALT/ANHYDRITE; ANHYDRITE; off white, tan, very soft, sticky in part, some medium dark gray mudstone, trace brick red shale partings
	MB3s at 7789' MD
7800-7830'	LIMESTONE; light gray, microcrystalline, firm, slightly argillaceous, tight, poor intergranualr porosity
7830-7860'	ANHYDRITE/LIMESTONE - MARLY: ANHYDRITE; off white, tan, very soft, sticky in part, LIMESTONE - MARLY; light brown, light tan, medium gray, moderately hard, slightly mottled in part
7860-7890'	LIMESTONE-MARLY/ANHYDRITE: LIMESTONE - MARLY; light brown, light tan, medium gray, moderately hard, slightly mottled in part, microcrystalline, strong marly in part, tight, poor intergranualr porosity, ANHYDRITE; off white, tan, very soft, sticky in part
	M2s at 7885' MD
	Mb2s at 7891' MD
7890-7920'	LIMESTONE - MARLY/ANHYDRITE: LIMESTONE - MARLY; light brown, light tan, medium gray, moderately hard, slightly mottled in part, microcrystalline, strong marly in part, tight, poor intergranualr porosity, ANHYDRITE; off white, tan, very soft, sticky in part, trace salt
7920-7950'	LIMESTONE - MARLY/ANHYDRITE: LIMESTONE - MARLY; light brown, light tan, medium gray, moderately hard, slightly mottled in part, microcrystalline, strong marly in part, tight, poor intergranualr porosity, ANHYDRITE; off white, tan, very soft, sticky in part, trace salt

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
7950-7980'	SALT/ANHYDRITE: SALT; clear, semi translucent, brittle in part, massive in part, trace marly limestone, ANHYDRITE
	Mbgp at 7984' MD
7980-8010'	SALT: clear, semi-translucent, brittle in part, massive in part, trace marly limestone, trace anhydrite
8010-8040'	SALT: clear, semi- translucent, brittle in part, massive in part, trace marly limestone, trace anhydrite
	Mls at 8019' MD
8040-8070'	LIMESTONE to Marly/ANHYDRITE: LIMESTONE; light gray, light tan to medium brown, cryptocrystalline, mottled in part, strong marly in part, firm, trace carbonaceous matter, tight, poor intergranualr porosity, ANHYDRITE; off white, light tan, slightly light gray, cryptocrystalline, soft to firm, amorphous
	Mbls at 8064' MD
8070-8100'	LIMESTONE to Marly/ANHYDRITE: LIMESTONE; light gray, light tan to medium brown, cryptocrystalline, mottled in part, strong marly in part, firm, trace carbonaceous matter, tight, poor intergranualr porosity, ANHYDRITE; off white, light tan, slightly light gray, cryptocrystalline, soft to firm, amorphous
8100-8130'	LIMESTONE/ANHYDRITE: LIMESTONE; light gray, light tan to medium brown, some medium dark gray, cryptocrystalline, mottled in part, firm, trace carbonaceous matter, tight, poor intergranualr porosity, ANHYDRITE; off white, light tan, slightly light gray, cryptocrystalline, soft to firm, amorphous
8130-8160'	LIMESTONE/ANHYDRITE: LIMESTONE; light gray, light tan to medium brown, some medium dark gray, cryptocrystalline, mottled in part, firm, trace carbonaceous matter, tight, poor intergranualr porosity, ANHYDRITE; off white, light tan, slightly light gray, cryptocrystalline, soft to firm, amorphous

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
8160-8190'	LIMESTONE/ANHYDRITE: LIMESTONE; light gray, light tan to medium brown, some medium dark gray, cryptocrystalline, mottled in part, slightly marly in part, firm, trace carbonaceous matter, tight, poor intergranualr porosity, ANHYDRITE; off white, light tan, slightly light gray, cryptocrystalline, soft to firm, amorphous
8190-8220'	LIMESTONE: light gray, light tan to medium brown, some medium dark gray, cryptocrystalline, mottled in part, firm, trace carbonaceous matter, tight, poor intergranualr porosity, some anhydrite
8220-8250'	LIMESTONE: light gray, light tan to medium brown, some medium dark gray, cryptocrystalline, mottled in part, firm, trace carbonaceous matter, slightly marly in part, tight, poor intergranualr porosity, some anhydrite
	Mmc at 8236' MD
8250-8280'	LIMESTONE: light gray, light tan to medium brown, some medium dark gray, cryptocrystalline, mottled in part, firm, trace carbonaceous matter, slightly marly in part, tight, poor intergranualr porosity, trace anhydrite
8280-8310'	LIMESTONE: light gray, light tan to medium brown, some medium dark gray, cryptocrystalline, mottled in part, firm, trace carbonaceous matter, slightly marly in part, tight, poor intergranualr porosity, trace anhydrite
8310-8340'	ANHYDRITE/LIMESTONE: ANHYDRITE; off white, tan, light tan, soft, amorphous, LIMESTONE; light gray, light tan to medium brown, some medium dark gray, cryptocrystalline, mottled in part, firm, trace carbonaceous matter, slightly marly in part, tight, poor intergranualr porosity
8340-8370'	ANHYDRITE/LIMESTONE: ANHYDRITE; off white, tan, light tan, soft, amorphous, LIMESTONE; light gray, light tan to medium brown, some medium dark gray, cryptocrystalline, mottled in part, firm, trace carbonaceous matter, slightly marly in part, tight, poor intergranualr porosity
8370-8400'	ANHYDRITE/LIMESTONE: ANHYDRITE; off white, tan, light tan, soft, amorphous, LIMESTONE; light gray, light tan to medium brown, some medium dark gray, cryptocrystalline, mottled in part, firm, trace carbonaceous matter, slightly marly in part, tight, poor intergranualr porosity

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
8400-8430'	LIMESTONE: light tan, light gray tan, cryptocrystalline, slightly argillaceous, moderately firm to firm, trace carbonaceous matter, tight, poor intergranualr porosity
8430-8460'	LIMESTONE: light tan, light gray tan, cryptocrystalline, slightly argillaceous, firm to moderately hard, trace carbonaceous matter, tight, poor intergranualr porosity
8460-8490'	LIMESTONE: light tan, light gray tan, cryptocrystalline, slightly argillaceous, moderately hard, trace carbonaceous matter, tight, poor intergranualr porosity
8490-8520'	LIMESTONE: medium dark gray, minor light tan, microcrystalline, moderately hard, sub blocky, very slightly argillaceous, trace anhydrite, some carbonaceous, tight, poor intergranualr porosity, dull weak slightly yellow white fluorescence, dull light white diffuse cut, white slightly light yellow ring
8520-8550'	LIMESTONE: medium dark gray, minor light tan, off white in part, mottled in part microcrystalline, moderately hard, sub blocky, very slightly argillaceous, trace anhydrite, abundant carbonaceous matter in part, tight, poor intergranualr porosity, light yellow light grain white fluorescence, white diffuse cut, bright white to bright yellow ring
8550-8580'	LIMESTONE: medium dark gray, minor light tan, off white in part, mottled in part microcrystalline, moderately hard, sub blocky, very slightly argillaceous, trace anhydrite, abundant carbonaceous matter in part, tight, poor intergranualr porosity, light yellow light grain white fluorescence, white diffuse cut, bright white to bright yellow ring
8580-8610'	LIMESTONE: medium dark gray, minor light tan, off white in part, mottled in part microcrystalline, moderately hard, sub blocky, very slightly argillaceous, trace anhydrite, abundant carbonaceous matter in part, tight, poor intergranualr porosity, light yellow light green white fluorescence, white diffuse cut, bright white to bright yellow ring
8610-8640'	LIMESTONE: medium dark gray, minor light tan, off white in part, mottled in part microcrystalline, moderately hard, sub blocky, very slightly argillaceous, trace anhydrite, abundant carbonaceous matter in part, tight, poor intergranualr porosity, light yellow light grain white fluorescence, white diffuse cut, bright white to bright yellow ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
8640-8670'	LIMESTONE: medium dark gray, minor light tan, off white in part, mottled in part microcrystalline, moderately hard, sub blocky, very slightly argillaceous, trace anhydrite, abundant carbonaceous matter in part, tight, poor intergranualr porosity, light yellow light green white fluorescence, white diffuse cut, bright white to bright yellow ring
8670-8700'	LIMESTONE: medium dark gray, minor light tan, off white in part, mottled in part microcrystalline, moderately hard, sub blocky, very slightly argillaceous, trace anhydrite, carbonaceous matter in part, tight, poor intergranualr porosity, light yellow light green white fluorescence, white diffuse cut, bright white to bright yellow ring
8700-8730'	LIMESTONE: medium dark gray, minor light tan, off white in part, mottled in part microcrystalline, moderately hard, sub blocky, very slightly argillaceous, trace anhydrite, carbonaceous matter in part, tight, poor intergranualr porosity, light yellow light green white fluorescence, white diffuse cut, bright white to bright yellow ring
8730-8760'	LIMESTONE: medium dark gray, minor light tan, off white in part, mottled in part microcrystalline, moderately hard, sub blocky, very slightly argillaceous, trace anhydrite, carbonaceous matter in part, tight, poor intergranualr porosity, light yellow light green white fluorescence, white diffuse cut, bright white to yellow ring
8760-8790'	LIMESTONE: medium dark gray, minor light tan, off white in part, mottled in part microcrystalline, moderately hard, sub blocky, very slightly argillaceous, trace anhydrite, carbonaceous matter in part, tight, poor intergranualr porosity, light yellow light green white fluorescence, white diffuse cut, bright white to yellow ring
8790-8820'	LIMESTONE: medium dark gray, minor light tan, off white in part, mottled in part microcrystalline, moderately hard, sub blocky, very slightly argillaceous, trace anhydrite, carbonaceous matter in part, tight, poor intergranualr porosity, light yellow light green white fluorescence, white diffuse cut, bright white to yellow ring
8820-8850'	LIMESTONE: medium dark gray, minor light tan, off white in part, mottled in part microcrystalline, moderately hard, sub blocky, very slightly argillaceous, trace anhydrite, carbonaceous matter in part, tight, poor intergranualr porosity, light yellow light green white fluorescence, white diffuse cut, bright white to yellow ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION

MI at 8836' MD

8850-8880'	LIMESTONE: medium dark gray, minor light tan, off white in part, mottled in part microcrystalline, moderately hard, sub blocky, very slightly argillaceous, trace anhydrite, carbonaceous matter in part, tight, poor intergranular porosity, light yellow light green white fluorescence, white diffuse cut, white to yellow ring
8880-8910'	LIMESTONE: medium dark gray, minor light tan, off white in part, mottled in part microcrystalline, moderately hard, sub blocky, very slightly argillaceous, some anhydrite, carbonaceous matter in part, tight, poor intergranualr porosity, dull light yellow light grain white fluorescence, white diffuse cut, white to yellow ring
8920-8940'	LIMESTONE: light tan, light cream off white in part, mottled in part microcrystalline, moderately hard, sub blocky, very slightly argillaceous, some anhydrite, minor carbonaceous matter in part, tight, poor intergranualr porosity, dull light yellow light grain white fluorescence, dull light white diffuse cut, white to slightly yellow ring
8940-8970'	LIMESTONE: gray medium dark gray, minor light cream tan, microcrystalline, cryptocrystalline in part, moderately hard, brittle in part, sub blocky, slightly argillaceous, trace anhydrite, tight, poor intergranualr porosity, dull spotty light slightly yellow white fluorescence, dull light white diffuse cut, white light yellow to weak light green ring
8970-9000'	LIMESTONE: gray medium dark gray, minor light cream tan, microcrystalline, cryptocrystalline in part, moderately hard, brittle in part, sub blocky, slightly argillaceous, trace anhydrite, tight, poor intergranualr porosity, dull spotty light slightly yellow white fluorescence, dull light white diffuse cut, white light yellow to weak light green ring
9000-9030'	LIMESTONE: gray medium dark gray, minor light cream tan, microcrystalline, cryptocrystalline in part, moderately hard, brittle in part, sub blocky, slightly argillaceous, trace anhydrite, tight, poor intergranualr porosity, dull spotty light slightly yellow white fluorescence, dull light white diffuse cut, white light yellow to weak light green ring
9030-9060'	LIMESTONE: gray medium dark gray, minor light cream tan, microcrystalline, cryptocrystalline in part, moderately hard, brittle in part, sub blocky, slightly argillaceous, trace anhydrite, tight, poor intergranualr porosity, dull spotty light slightly yellow white fluorescence, dull light white diffuse cut, white light yellow to weak light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
9060-9090'	LIMESTONE: gray medium dark gray, minor light cream tan, microcrystalline, cryptocrystalline in part, moderately hard, brittle in part, sub blocky, slightly argillaceous, tight, poor intergranualr porosity, dull spotty light slightly yellow white fluorescence, dull light white diffuse cut, white light yellow to weak light green ring
9090-9120'	LIMESTONE: gray medium dark gray, minor light cream tan, microcrystalline, cryptocrystalline in part, moderately hard, brittle in part, sub blocky, slightly argillaceous, tight, poor intergranualr porosity, dull spotty light slightly yellow white fluorescence, dull light white diffuse cut, white light yellow to weak light green ring
9120-9150'	LIMESTONE: gray medium dark gray, minor light cream tan, microcrystalline, cryptocrystalline in part, moderately hard, brittle in part, sub blocky, slightly argillaceous, tight, poor intergranualr porosity, dull spotty light slightly yellow white fluorescence, dull light white diffuse cut, white light yellow to weak light green ring
9150-9180'	LIMESTONE: gray medium dark gray, minor light cream tan, microcrystalline, cryptocrystalline in part, moderately hard, brittle in part, sub blocky, slightly argillaceous, tight, poor intergranualr porosity, dull spotty light slightly yellow white fluorescence, dull light white diffuse cut, white light yellow to weak light green ring
9180-9210'	LIMESTONE: gray medium dark gray, minor light cream tan, microcrystalline, cryptocrystalline in part, moderately hard, brittle in part, sub blocky, slightly argillaceous, tight, poor intergranualr porosity, dull spotty light slightly yellow white fluorescence, dull light white diffuse cut, white light yellow to weak light green ring
9210-9240'	LIMESTONE: gray medium dark gray, minor light cream tan, microcrystalline, cryptocrystalline in part, moderately hard, brittle in part, sub blocky, slightly argillaceous, tight, poor intergranualr porosity, dull spotty light slightly yellow white fluorescence, dull light white diffuse cut, white light yellow to weak light green ring
9240-9270'	LIMESTONE: gray medium dark gray, minor light cream tan, microcrystalline, cryptocrystalline in part, moderately hard, brittle in part, sub blocky, slightly argillaceous, tight, poor intergranualr porosity, dull spotty light slightly yellow white fluorescence, dull light white diffuse cut, white light yellow to weak light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
9270-9300'	LIMESTONE: gray medium dark gray, minor light cream tan, microcrystalline, cryptocrystalline in part, moderately hard, brittle in part, sub blocky, slightly argillaceous, tight, poor intergranualr porosity, dull spotty light slightly yellow white fluorescence, dull light white diffuse cut, white light yellow to weak light green ring
9300-9330'	LIMESTONE: gray medium dark gray, minor light cream tan, microcrystalline, cryptocrystalline in part, moderately hard, brittle in part, sub blocky, slightly argillaceous, tight, poor intergranualr porosity, dull spotty light slightly yellow white fluorescence, dull light white diffuse cut, white light yellow to weak light green ring
9330-9360'	LIMESTONE: medium dark gray, minor light cream, cryptocrystalline in part, moderately hard, brittle in part, sub blocky, slightly argillaceous, tight, poor intergranualr porosity, dull spotty light slightly yellow white fluorescence, dull light white diffuse cut, white light yellow to weak light green ring
9360-9390'	LIMESTONE: medium dark gray, minor light cream, cryptocrystalline in part, moderately hard, brittle in part, sub blocky, slightly argillaceous, tight, poor intergranualr porosity, dull spotty light slightly yellow white fluorescence, dull light white diffuse cut, white light yellow to weak light green ring
9390-9420'	LIMESTONE: medium dark gray, minor light cream, cryptocrystalline in part, moderately hard, brittle in part, sub blocky, slightly argillaceous, tight, poor intergranualr porosity, dull spotty light slightly yellow white fluorescence, dull light white diffuse cut, white light yellow to weak light green ring
9420-9450'	LIMESTONE: medium dark gray, minor light cream, cryptocrystalline in part, moderately hard, brittle in part, sub blocky, slightly argillaceous, tight, poor intergranualr porosity, dull spotty light slightly yellow white fluorescence, dull light white diffuse cut, white light yellow to weak light green ring
9450-9480'	LIMESTONE: medium dark gray, minor light cream, cryptocrystalline in part, moderately hard, brittle in part, sub blocky, slightly argillaceous, tight, poor intergranualr porosity, dull spotty light slightly yellow white fluorescence, dull light white diffuse cut, white light yellow to weak light green ring
9480-9510'	LIMESTONE: medium dark gray, minor light cream, cryptocrystalline in part, moderately hard, brittle in part, sub blocky, slightly argillaceous, tight, poor intergranualr porosity, dull spotty light slightly yellow white fluorescence, dull light white diffuse cut, white light yellow to weak light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
9510-9540'	LIMESTONE: medium dark gray, minor light cream, cryptocrystalline in part, moderately hard, brittle in part, sub blocky, slightly argillaceous, tight, poor intergranualr porosity, dull spotty light slightly yellow white fluorescence, dull light white diffuse cut, white light yellow to weak light green ring
9540-9570'	LIMESTONE: medium dark gray, minor light cream, cryptocrystalline in part, moderately hard, brittle in part, sub blocky, slightly argillaceous, tight, poor intergranualr porosity, dull spotty light slightly yellow white fluorescence, dull light white diffuse cut, white light yellow to weak light green ring
9570-9600'	LIMESTONE: medium dark gray, minor light cream, cryptocrystalline in part, moderately hard, brittle in part, sub blocky, slightly argillaceous, tight, poor intergranualr porosity, dull spotty light slightly yellow white fluorescence, dull light white diffuse cut, white light yellow to weak light green ring
9600-9630'	LIMESTONE: medium dark gray, minor light cream, cryptocrystalline in part, moderately hard, brittle in part, sub blocky, slightly argillaceous, tight, poor intergranualr porosity, dull spotty light slightly yellow white fluorescence, dull light white diffuse cut, white light yellow to weak light green ring
9630-9660'	LIMESTONE: medium dark gray, minor light cream, cryptocrystalline in part, moderately hard, brittle in part, sub blocky, slightly argillaceous, tight, poor intergranualr porosity, dull spotty light slightly yellow white fluorescence, dull light white diffuse cut, white light yellow to weak light green ring
9660-9690'	LIMESTONE: medium dark gray, light gray, minor light cream, cryptocrystalline in part, moderately hard, brittle in part, sub blocky, slightly argillaceous, tight, poor intergranualr porosity, dull spotty light slightly yellow white fluorescence, dull light white diffuse cut, white light yellow to weak light green ring
9690-9720'	LIMESTONE: medium dark gray, light gray, tan, trace minor light cream, cryptocrystalline to microcrystalline, moderately hard, brittle in part, sub blocky, slightly argillaceous, tight, poor intergranualr porosity, dull spotty light slightly yellow white fluorescence, dull light white diffuse cut, white light yellow to weak light green ring
9720-9750'	LIMESTONE: medium dark gray, light gray, tan, trace minor light cream, cryptocrystalline to microcrystalline, moderately hard, brittle in part, sub blocky, slightly argillaceous, tight, poor intergranualr porosity, dull spotty light slightly yellow white fluorescence, dull light white diffuse cut, white light yellow to weak light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
9750-9780'	LIMESTONE: medium dark gray, light gray, tan, trace minor light cream, cryptocrystalline to microcrystalline, moderately hard, brittle in part, sub blocky, argillaceous, tight, poor intergranualr porosity, dull spotty light slightly yellow white fluorescence, dull light white diffuse cut, white light yellow to weak light green ring
	Mlfb at 9772' MD, 9631.5' TVD
9780-9810'	LIMESTONE: medium dark gray, light gray, tan, trace minor light cream, cryptocrystalline to microcrystalline, moderately hard, brittle in part, sub blocky, argillaceous, tight, poor intergranualr porosity, spotty light white slightly yellow faint light green fluorescence, bright white slightly light yellow diffuse cut, bright white to light yellow to light green ring
	Mbku at 9810' MD, 9646' TVD
9810-9840'	SHALE: dark black, waxy, firm, non calcareous, greasy, petroliferous, tight, poor intercrystalline porosity, spotty light yellow slightly light grain fluorescence, light white diff cut, fast bright white slightly yellow streams, bright white to slightly yellow light green ring
9840-9876'	SHALE: dark black, waxy, firm, non calcareous, greasy, petroliferous, tight, poor intercrystalline porosity, spotty light yellow slightly light grain fluorescence, light white diff cut, fast bright white slightly yellow streams, bright white to slightly yellow light green ring
	Mbkm at 9875' MD, 9665.5' TVD
9876-9900'	ARGILLACEOUS LIMESTONE/SILTY LIMESTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, moderately strong weak argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diff cut, fast white streams, bright white to slightly yellow light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
9900-9930'	SILTY LIMESTONE/ ARGILLACEOUS SILTY LIMESTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, moderately strong weak argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diff cut, fast white streams, bright white to slightly yellow light green ring
	Mbkmgr at 9925' MD, 9677' TVD
9930-9360'	SILTY LIMESTONE/ ARGILLACEOUS SILTY LIMESTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, moderately strong weak argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diff cut, fast white streams, bright white to slightly yellow light green ring
9360-9390'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, off white, mottled in part, microcrystalline, sucrosic in part, firm to moderately hard, weak argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diff cut, fast white streams, bright white to slightly yellow light green ring
9390-10020'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, off white, mottled in part, microcrystalline, sucrosic in part, firm to moderately hard, weak argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diff cut, fast white streams, bright white to slightly yellow light green ring
10020-10045'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, off white, mottled in part, microcrystalline, sucrosic in part, firm to moderately hard, weak argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diff cut, fast white streams, bright white to slightly yellow light green ring
10045-10100'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, off white, mottled in part, microcrystalline, sucrosic in part, firm to moderately hard, weak argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, dull spotty light yellow white slightly grain fluorescence, white blooming diffuse cut, moderately fast white streams, white to slightly yellow dull light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
10100-10150'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, off white, mottled in part, microcrystalline, sucrosic in part, firm to moderately hard, argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, dull spotty light yellow white slightly grain fluorescence, white blooming diffuse cut, moderately fast white streams, white to slightly yellow dull light green ring
10150-10200'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, off white, mottled in part, microcrystalline, sucrosic in part, firm to moderately hard, argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, dull spotty light yellow white slightly grain fluorescence, white blooming diffuse cut, moderately fast white streams, white to slightly yellow dull light green ring
10200-10250'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, off white, mottled in part, microcrystalline, sucrosic in part, firm to moderately hard, argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, dull spotty light yellow white slightly grain fluorescence, white blooming diffuse cut, moderately fast white streams, white to slightly yellow dull light green ring
10250-10300'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, off white, mottled in part, microcrystalline, sucrosic in part, firm to moderately hard, argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, dull spotty light yellow white slightly grain fluorescence, white blooming diffuse cut, moderately fast white streams, white to slightly yellow dull light green ring
10300-10350'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, off white, mottled in part, microcrystalline, sucrosic in part, firm to moderately hard, argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, dull spotty light yellow white slightly grain fluorescence, white blooming diffuse cut, moderately fast white streams, white to slightly yellow dull light green ring
10350-10400'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, off white, mottled in part, microcrystalline, sucrosic in part, firm to moderately hard, argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, dull spotty light yellow white slightly grain fluorescence, white blooming diffuse cut, moderately fast white streams, white to slightly yellow dull light green ring
10400-10450'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, off white, mottled in part, microcrystalline, sucrosic in part, firm to moderately hard, argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, white blooming diffuse cut, moderately fast white streams, white to slightly yellow dull light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
10450-10500'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, white blooming diffuse cut, moderately fast white streams, white to slightly yellow dull light green ring
10500-10550'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, mottled in part, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, white blooming diffuse cut, moderately fast white streams, white to slightly yellow dull light green ring
10550-10600'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
10600-10650'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
10650-10700'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
10700-10750'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
10750-10800'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
10800-10850'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
10850-10900'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
10900-10950'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
10950-11000'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
11000-11050'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
11050-11100'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
11100-11150'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
11150-11200'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
11200-11250'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
11250-11300'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
11300-11350'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
11350-11400'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
11400-11450'	SILTY ARGILLACEOUS LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
11450-11500'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
11500-11550'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
11550-11600'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
11600-11650'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
11650-11700'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
11700-11750'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
11750-11800'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
11800-11850'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
11850-11900'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
11900-11950'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
11950-12000'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
12000-12050'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
12050-12100'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
12100-12150'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
12150-12200'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, light gray off white, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
12200-12250'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, light gray off white, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
12250-12300'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, light gray off white, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
12300-12350'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, light gray off white, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
12350-12400'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, light gray off white, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
12400-12450'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, light gray off white, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
12450-12500'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, light gray off white, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
12500-12550'	SILTY LIMESTONE/LIMEY SILTSTONE: medium gray, light gray, light gray off white, microcrystalline, sucrosic in part, firm to moderately hard, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
12550-12600'	SILTY LIMESTONE/LIMEY SILTSTONE/PACKSTONE: medium gray, light gray, light gray, off white, microcrystalline, sucrosic in part, firm to moderately hard, mottled in part, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
12600-12650'	PACKSTONE/SILTY LIMESTONE/LIMEY SILTSTONE: light gray, off white, medium gray, medium dark gray, microcrystalline, sucrosic in part, firm to moderately hard, mottled in part, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
12650-12700'	PACKSTONE/SILTY LIMESTONE/LIMEY SILTSTONE: light gray, off white, medium gray, medium dark gray, microcrystalline, sucrosic in part, firm to moderately hard, mottled in part, some very fine slit lined laminations, weak argillaceous in part, minor disseminated pyrite, some oil stain, tight, poor intercrystalline porosity, moderately even light yellow dull light grain fluorescence, fast bright white blooming diffuse cut, fast bright white streams, bright white to late light yellow dull light green ring
12700-12750'	SILTY LIMESTONE/PACKSTONE: medium gray, dark gray, light gray, off white, mottled in part, microcrystalline, sucrosic in part, firm to moderately hard, weak argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
12750-12800'	SILTY LIMESTONE/ARGILLACEOUS SILTY LIMESTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, moderately strong argillaceous in part, some packstone, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
12800-12850'	SILTY LIMESTONE/ARGILLACEOUS SILTY LIMESTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, moderately strong argillaceous in part, some packstone, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
12850-12900'	SILTY LIMESTONE/ARGILLACEOUS SILTY LIMESTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, moderately strong argillaceous in part, some packstone, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
12900-12950'	SILTY LIMESTONE/ARGILLACEOUS SILTY LIMESTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, moderately strong argillaceous in part, some packstone, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
12950-13000'	SILTY LIMESTONE/ARGILLACEOUS SILTY LIMESTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, moderately strong argillaceous in part, some packstone, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
13000-13050'	SILTY LIMESTONE/ARGILLACEOUS SILTY LIMESTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, moderately strong argillaceous in part, some packstone, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
13050-13100'	SILTY LIMESTONE/ARGILLACEOUS SILTY LIMESTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, moderately strong argillaceous in part, some packstone, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
13100-13150'	SILTY LIMESTONE/ARGILLACEOUS SILTY LIMESTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, moderately strong argillaceous in part, some packstone, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
13150-13200'	SILTY LIMESTONE/ARGILLACEOUS SILTY LIMESTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, moderately strong argillaceous in part, some packstone, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
13200-13250'	SILTY LIMESTONE/ARGILLACEOUS SILTY LIMESTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, moderately strong argillaceous in part, some packstone, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
13250-13300'	SILTY LIMESTONE/PACKSTONE: medium gray, light gray, off white, mottled in part, microcrystalline, sucrosic in part, firm to moderately hard, weak argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
13300-13350'	SILTY LIMESTONE/ARGILLACEOUS SILTY LIMESTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, moderately strong argillaceous in part, some packstone, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
13350-13400'	SILTY LIMESTONE/ARGILLACEOUS SILTY LIMESTONE: medium gray, light gray, microcrystalline, sucrosic in part, firm to moderately hard, moderately strong argillaceous in part, some packstone, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
13400-13450'	PACKSTONE/SILTY LIMESTONE: light gray, medium gray, off white, mottled in part, microcrystalline, sucrosic in part, firm to moderately hard, weak argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
13450-13500'	PACKSTONE/SILTY LIMESTONE: light gray, medium gray, off white, mottled in part, microcrystalline, sucrosic in part, firm to moderately hard, weak argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
13500-13550'	PACKSTONE/SILTY LIMESTONE: light gray, medium gray, off white, mottled in part, microcrystalline, sucrosic in part, firm to moderately hard, weak argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
13550-13600'	SILTY LIMESTONE/PACKSTONE: medium gray, light gray, off white, mottled in part, microcrystalline, sucrosic in part, firm to moderately hard, weak argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
13600-13650'	PACKSTONE/SILTY LIMESTONE: light gray, medium gray, off white, mottled in part, microcrystalline, sucrosic in part, firm to moderately hard, weak argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
13650-13700'	PACKSTONE/SILTY LIMESTONE: light gray, medium gray, off white, mottled in part, microcrystalline, sucrosic in part, firm to moderately hard, weak argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
13700-13750'	PACKSTONE/SILTY LIMESTONE: light gray, medium gray, off white, mottled in part, microcrystalline, sucrosic in part, firm to moderately hard, weak argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
13750-13800'	PACKSTONE/SILTY LIMESTONE: light gray, medium gray, off white, mottled in part, microcrystalline, sucrosic in part, firm to moderately hard, weak argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
13800-13850'	PACKSTONE/SILTY LIMESTONE: light gray, medium gray, off white, mottled in part, microcrystalline, sucrosic in part, firm to moderately hard, weak argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
13850-13900'	PACKSTONE/SILTY LIMESTONE: light gray, medium gray, off white, mottled in part, microcrystalline, sucrosic in part, firm to moderately hard, weak argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty light yellow white slightly grain fluorescence, moderately fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
13900-13950'	SILTY LIMESTONE/ARGILLACEOUS SILTY LIMESTONE: light gray, medium gray, off white, minor mottled in part, microcrystalline, minor PACKSTONE, sucrosic in part, firm to moderately hard, weak argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty to moderately even light yellow white grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
13950-14000'	SILTY LIMESTONE/ARGILLACEOUS SILTY LIMESTONE: light gray, medium gray, off white, minor mottled in part, microcrystalline, minor PACKSTONE, sucrosic in part, firm to moderately hard, weak argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty to moderately even light yellow white grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
14000-14050'	SILTY LIMESTONE/ARGILLACEOUS SILTY LIMESTONE: light gray, medium gray, off white, minor mottled in part, microcrystalline, minor PACKSTONE, sucrosic in part, firm to moderately hard, weak argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty to moderately even light yellow white grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
14050-14100'	SILTY LIMESTONE/ARGILLACEOUS SILTY LIMESTONE: light gray, medium gray, off white, minor mottled in part, microcrystalline, sucrosic in part, firm to moderately hard, weak argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty to moderately even light yellow white grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
14100-14150'	SILTY LIMESTONE/ARGILLACEOUS SILTY LIMESTONE: light gray, medium gray, off white, minor mottled in part, microcrystalline, sucrosic in part, firm to moderately hard, weak argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty to moderately even light yellow white grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
14150-14200'	SILTY LIMESTONE/ARGILLACEOUS SILTY LIMESTONE: light gray, medium gray, off white, minor mottled in part, microcrystalline, sucrosic in part, firm to moderately hard, weak argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty to moderately even light yellow white grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
14200-14250'	SILTY LIMESTONE/ARGILLACEOUS SILTY LIMESTONE: light gray, medium gray, off white, minor mottled in part, microcrystalline, sucrosic in part, firm to moderately hard, weak argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty to moderately even light yellow white grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
14250-14300'	SILTY LIMESTONE/ARGILLACEOUS SILTY LIMESTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty to moderately even light yellow white grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
14300-14350'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty to moderately even light yellow white grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
14350-14400'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty to moderately even light yellow white grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
14400-14450'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty to moderately even light yellow white grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
14450-14500'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty to moderately even light yellow white grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
14500-14550'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty to moderately even light yellow white grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
14550-14600'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty to moderately even light yellow white grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
14600-14650'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty to moderately even light yellow white grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
14650-14700'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty to moderately even light yellow white grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
14700-14750'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty to moderately even light yellow white grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
14750-14800'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty to moderately even light yellow white grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
14800-14850'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty to moderately even light yellow white grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
14850-14900'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty to moderately even light yellow white grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
14900-14950'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty to moderately even light yellow white grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
14950-15000'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty to moderately even light yellow white grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
15000-15050'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty to moderately even light yellow white grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
15050-15100'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty to moderately even light yellow white grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
15100-15150'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty to moderately even light yellow white grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
15150-15200'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty to moderately even light yellow white grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
15200-15250'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty to moderately even light yellow white grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
15250-15300'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, spotty to moderately even light yellow white grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
15300-15350'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow white grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
15350-15400'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
15400-15450'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
15450-15500'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
15500-15550'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
15550-15600'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
15600-15650'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
15650-15700'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
15700-15750'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
15750-15800'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
15800-15850'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring, some TOOH/TIH contamination

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
15850-15900'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring, some TOOH/TIH contamination
15900-15950'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring, some TOOH/TIH contamination
15950-16000'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
16000-16050'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
16050-16100'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
16100-16150'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
16150-16200'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
16200-16250'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
16250-16300'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
16300-16350'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
16350-16400'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
16400-16450'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
16450-16500'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
16500-16550'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light ye light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
16550-16600'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
16600-16650'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
16650-16700'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
16700-16750'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
16750-16800'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
16800-16850'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
16850-16900'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
16900-16950'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
16950-17000'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
17000-17050'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
17050-17100'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
17100-17150'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
17150-17200'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
17200-17250'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
17250-17300'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
17300-17350'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
17350-17400'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
17400-17450'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
17450-17500'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
17500-17550'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
17550-17600'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
17600-17650'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
17650-17700'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
17700-17750'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
17750-17800'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
17800-17850'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
17850-17900'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
17900-17950'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
17950-18000'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
18000-18050'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
18050-18100'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
18100-18150'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
18150-18200'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
18200-18250'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
18250-18300'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
18300-18350'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
18350-18400'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
18400-18450'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
18450-18500'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
18500-18550'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
18550-18600'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
18600-18650'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
18650-18700'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
18700-18750'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
18750-18800'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
18800-18850'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
18850-18900'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
18900-18950'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
18950-19000'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
19000-19050'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
19050-19100'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
19100-19150'	ARGILLACEOUS SILTY LIMESTONE: light gray, medium gray, microcrystalline, sucrosic in part, firm to moderately hard, moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
19150-19250'	ARGILLACEOUS SILTY LIMESTONE: light gray, medium gray, microcrystalline, sucrosic in part, firm to moderately hard, moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
19150-19250'	ARGILLACEOUS SILTY LIMESTONE: light gray, medium gray, microcrystalline, sucrosic in part, firm to moderately hard, moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
19250-19300'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring

Formation tops Sample Interval (in feet)	SAMPLE DESCRIPTION
19300-19350'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
19350-19400'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
19400-19450'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
19450-19500'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring
19500-19536'	SILTY LIMESTONE/LIMEY SILTSTONE: light gray, medium gray, some off white, microcrystalline, sucrosic in part, firm to moderately hard, weak to moderately argillaceous in part, trace oil stain, tight, poor intercrystalline porosity, moderately even light yellow light grain fluorescence, fast white blooming diffuse cut, fast white streams, bright white to slightly yellow light green ring

GEOLOGICAL SUMMARY & CONCLUSIONS

The objective of the Lunker Federal 2-33-4H oil well is to drill a single, north-bearing, 9,731-foot long, horizontal (borehole) lateral, across the Mississippian, Middle Bakken Formation's highest porosity bearing strata horizons. This oil well's surface location is 250' from the north line (FNL) & 1,200' from the west line (FWL) (NWNW), Section 33, T 152 N, R 91 W, Mountrail County, North Dakota. The engineering oil-well plan sets the seven-inch intermediate casing 719' FNL & 1,288' FWL, NWNW, Section 33, T152N, R91W.

On August 21st, 2012, Cyclone's Drilling, Rig # 27, drilled out from the 13-inch surface casing, float and shoe at 1779' feet measure depth (MD). The borehole drilling mud fluid selected was the diesel-based, oil invert mud (OBM) with a 75/25 oil/water content. George Ogden, the company-man, supervised all of the oil well drilling operations.

On August 22nd, 2012, NorAm's Wellsite Services, geologists arrived at the well-site location. Then at 14:38, on August 23rd, 2012, at 7500' MD, the geological mud logging operations commenced at the top of the Mississippian, Charles Formation. The Mud Logging software utilized the vertical strip log and horizontal log versions from WellSight Systems, Incorporated. The borehole's geologic information came from; the time lagged drill cuttings, time lagged total gas unit values data, rate of drilling penetration data, and real time down hole gamma ray API data. The drilling rate of penetration (ROP) data was imported from the Pason (EDR) monitoring system through NorAm's MiniPac 2300, total gas detector. The total gas unit values were determined from the MiniPac 2300 hotwire total gas detector, which is calibrated at the standard of 100 units equals 1% methane in atm.

As per the North Dakota Oil Commissions requirements, the drill crew's rough necks caught the borehole's drill cuttings or geology samples at the 30 and then the 50-foot sample intervals. Then the samples were cleaned, dried, inventoried in order, for their library, and possibly later geologic and lab inspection.

On August 25th, 2012, at 20:00, the vertical section of the borehole was completed when Kick off Point (KOP) was reached at 9195 feet MD. The bottom hole assembly (BHA) selected and engineered to drill the borehole's curve segment employed the 2.5-degree (bit to bend) mud motor with a five bladed PDC, Hughes DP505F drill bit. The MWD tools included the gamma ray sensor that was set 36 feet behind the bit and the survey azimuth and inclination tool that was set 47 feet behind the bit.

Slawson's, Lunker Federal 2-33-4H wellbore's curve drilling plan is engineered to drill the vertical to horizontal wellbore curve at a 12.0-degrees/100 ft., build rate. By design, this lands the well bore's curve segment at a 90° horizontal inclination and inside a predetermined, 20-foot thick stratum, also referred to as the target zone. Throughout this report, the favorable porosity zone's target top is identified and labeled as the Mbkmgr marker.

From the kick-off point (KOP) 9190' MD, to the well's actual 88.6° degree horizontal target zone landing the OBM drilling mud weight ranged and was maintained from 10.6 to 10.7 ppg.

GEOLOGICAL SUMMARY & CONCLUSIONS (CONT.)

While drilling the wellbore's curve segment, five, low pressure and less than 4000 total gas unit, gas increases or shows were observed. The first gas show, increased to 1580 total gas units and it was mud logged from 9063' to 9090' MD. This Upper Lodgepole Formation gas show is not seen occurring in any surrounding correlation oil-well boreholes. The second gas show, increased to 253 total gas units, mud logged from 9704 to 9719' MD. This Lower Lodgepole Formation gas show is interpreted to occur as gas leakage and gas cap from the underlying Upper Bakken Shale source rocks. The third gas show, 2000 total gas units, 9798 to 9809' MD, is also a Lower Lodgepole Formation gas increase. That interpreted to occur as trapped gas, between the Lower Lodgepole, False Bakken Shale member and the underlie Upper Bakken Shale Formation. The fourth gas increase, 3613 peak total gas units that averaged 1800 total gas units, from 9810 to 9875' MD, is gas from the Upper Bakken Shale Formation. The fifth gas increase, 900 peak total gas units and average 750 units, 9925 to 9993' MD, is from the Middle Bakken Formation and or Lunker Federal 2-33-4H's horizontal drilling target zone (refer to the Total Gas Report data within this report).

On August 27th, 2012, at 11:31, the 8.75-inch diameter borehole reached the casing point at 10045' MD. Then the 7-inch intermediate casing was set at the total depth (TD) of 10035' MD. The curve to horizontal landing TD, was completed at an inclination of 88.6 degrees and/or approximately one-foot below the projected target zone center, which was intercepted at 9968' MD, 9683' TVD.

On August 30th, 2012, at 04:30 hours, drilling ahead commenced on the south-bearing horizontal borehole. The oil based diesel invert drilling mud was maintained across the entire horizontal lateral drilling coarse length. The directional drilling tool assembly (BHA) included; a 1.5-degree mud motor, a gamma ray sensor (set 37 ft behind the bit) and the survey tool (set 50 ft. behind the bit).

After drilling out from the float and casing shoe, the formation gas, background and connection total gas unit values climbed moderately and no surface flare was produced. The diesel invert mud weight was maintained from 10.0 to 10.4 ppg.

For the purpose of this geology report and for the Lunker Federal 2-33-4H borehole well site specific. The Middle Bakken Formation's target zone stratum is a moderately developed sedimentary, crude oil fluids reservoir. The Slawson Exploration Companies geologists are horizontal drilling, targeting the 6 to 12 percent porosity stratum that occurs directly beneath the Mbkmgr marker. This distinct Mbkmgr marker is becoming recognized oilfield wide, because of its high, greater than 100 API gamma ray character. That at times, the marker can climb and peak greater than 150 API gamma ray values. The target zone's stratigraphic units are identified by lithology, drilling penetration rate (ROP), gamma ray API counts per second and sometimes by the visual trichloroethylene/fluorescence cuts and total background gas unit values.

GEOLOGICAL SUMMARY & CONCLUSIONS (CONT.)

Beginning at the target zone's top or the Mbkmgr marker, the following lithology descriptions describe the target zone's stratigraphic section. The target zone's top strata or bedding units are classified as; argillaceous silty limestone (dirtiest or hottest api gamma), consisting of thin, moderate to strong argillaceous, silty limestone beds, that may or may not overly the packstone facies. The Packstone facies or stratum, is almost always low in api gamma counts (30's to low 40's) and is often identified as a very fine-grain, sandy in-part to silty dolomitic limestone, thickness varies from 4 feet to pinching out and generally slow rotation drilling penetration rates (less than 40 ft/hr) are observed. Beneath the Packstone stratum or sometimes called the shoal facies, the lithology gradually changes downward to a limy or calcaric siltstone strata that too varies in thickness. Then, the lower most target zone strata become a silty argillaceous limestone and the gamma ray API character can mimic the gamma ray character logged from the Mbkmgr marker.

Across the Lunker Federal 2-33-4H's, south-bearing horizontal lateral's course length, the Packstone facies was intercepted from 9927 – 9956' MD, 12592 – 12707' MD, 13421 – 13514' MD and 13683 – 13892' MD. The determined packstone thickness ranged from 4 feet at curve landing to 1.75 feet thick in the lateral.

At times, all target zone stratigraphic horizons may host some trace to minor amounts of carbonaceous matter, visually seen (2 x microscope) occurring within the porosity grain boundaries, along parting seams and or within the extremely fine to micro, silt-lined laminations. The visible carbonaceous masses appear as very fine, dark black, less than silt size, bitumen particles, or as smears and streaks along some of the micro-bedding laminations and or tight parting planes. The target zones intergranular porosity is considered tight. However, the stratum directly beneath the Mbkmgr marker can range from 6 to 12 percent porosity. The target's stratigraphic section appears to be comprised of a series of thinly bedded, limy silty bed

Therefore, identifying the target zone strata and providing the Directional Drillers with projected apparent (dip) formation inclinations or sometimes called waypoints, with measured depths and true vertical depths can become a geometry and trigonometry exercise.
s, comprised of very thin silt lined laminations to calcareous cemented silt rich units..

The borehole's drill cuttings went from chips (early in the lateral), to a very fine powder OBM mush paste. The geology sample oil-shows, that are presented on the Horizontal Wellsite Mud Log, describes the sample's intergranular porosity percent, as tight and the visual (observed) cuts are logged as spotty to moderately even and graded or rated, in the poor to fair range. While using the OBM (diesel Based Invert mud), the entire geological rock chip samples were submersed, coated and diesel oil contaminated. Which in-turn, enhances and influences (always upgrading) the samples visual fluorescence visual test cut observations. After the samples are cleaned, dried (under a lamp) and tested in a spot dish with 10% dilute hydrochloric acid, some of the samples show less than or equal to 20-40%, un-dissolved silt grains and argillaceous-mush; sometimes leaving a trace to some dull green/ tan brown, oily residue. This test suggests that there is a greater carbonate-chemical content by volume than clastic-silty sediment content.

GEOLOGICAL SUMMARY & CONCLUSIONS (CONT.)

On September 11th, 2012, at 17:15, the horizontal lateral drilling reached the wellbore total depth (TD) of 19536' MD. At TD, the TVD versus MD Plot, places the end (point) of the horizontal lateral borehole at the target zone's center. The bottom hole location for the Lunker Federal 2-33-4H is 253' FSL & 1347' FWL (SWSW) Sec.4, T152N, R91W.

From the end of the 7-inch intermediate casing, set at 10035' MD to the end of the horizontal lateral at 19536' MD, this south-bearing horizontal open-borehole cuts and exposes 9501' of the Middle Bakken Formation. The Lunker Federal 2-33-4H oil well is now ready for the following oil well engineering development stages and completion procedures.

From the casing shoe forward, a total of 53 directional drilling steering slides were performed for both azimuth and inclination direction corrections. In summary, 5.5 slides per 1000 feet of lateral drilled or one slide per 180 horizontal feet drilled was performed.

The following drill bits, footage performance summary, are only concerned with the drilling the horizontal lateral segment of this oil-well borehole (7' casing shoe to TD). This includes the footage drilled while performing the directional geosteering slides that were necessary to complete this south-bearing horizontal lateral well plan. The drill bits number, 5 and 6, together drilled 9491 feet of horizontal lateral in 256.5 bit hours. The average drilling rate (ROP) from the casing shoe to TD, which includes the directional geosteering drilling time, was 37 feet per hour.

The target zone stratum has three to four hard streaks or stringers that often kicked or bounced the well-bore's survey paths, azimuth and inclination off course. On many occasions, the hard formation strikes knocked both the survey azimuth and inclinations off course and some changes were greater than 2.25 degrees. However, all performed directional drilling (geosteering) slides did maintain both the pre-spud oil well engineering plans magnetic azimuth bearing and inclination angle.

The average formation (apparent dip) inclination is determined from using the wellbore survey's TVD's, from the target zone' Mbkmgr (top) marker and six target zone base marker intercepts. Beginning at the first target zone base marker wellbore intercept the calculated formation inclinations are; 10272' to 11388' MD = 89.75°, 14180' to 17064' MD = 89.86°, 17064' to 195538' = 89.6°. Therefore, the calculated formation inclination from the first target zone center intercept (start)to the final (projected) target zone at TD is 89.73°.

NORTH DAKOTA
OIL AND GAS DIVISION

Oil and Gas Division

Lynn D. Helms - Director Bruce E. Hicks - Assistant Director
Department of Mineral Resources
Lynn D. Helms - Director
North Dakota Industrial Commission
www.dmr.nd.gov/oilgas

23105 TA

BOB BOGLE Date: **6/12/2012**
SLAWSON EXPLORATION COMPANY, INC.
1675 BROADWAY SUITE 1600
DENVER, CO 80202 USA

RE: **CORES AND SAMPLES**

Well Name: **LUNKER FEDERAL 2-33-4H** Well File No.: **23105**
Location: **NWNW 33-152-91** County: MOUNTRAIL
Permit Type: **Development - HORIZONTAL**
Field: **VAN HOOK** Target Horizon: BAKKEN

Dear BOB BOGLE:

North Dakota Century Code (NDCC) Section 38-08-04 provides for the preservation of cores and samples and their shipment to the State Geologist when requested. The following is required on the above referenced well:

1) All cores, core chips and samples must be submitted to the State Geologist as provided for the NDCC Section 38-08-04 and North Dakota Administrative Code 43-02-03-38.1.

2) Samples shall include all cuttings from:

Base of the Last Charles Salt

Samples of cuttings shall be taken at 30' maximum intervals through all vertical, build and horizontal sections. Samples must be washed, dried, packed in sample envelopes in correct order with labels showing operator, well name, location and depth, and forwarded in standard boxes to the State Geologist within 30 days of the completion of drilling operations.

3) Cores: ALL CORES cut shall be preserved in correct order, properly boxed, and forwarded to the State Geologist within 90 days of completion of drilling operations. Any extension of time must have written approval from the State Geologist.

4) All cores, core chips, and samples must be shipped, prepaid, to the State Geologist at the following address:

ND Geological Survey Core Library
Campus Road and Cornell
Grand Forks, ND 58202

5) NDCC Section 38-08-16 allows for a civil penalty for any violation of Chapter 38 08 not to exceed $12,500 for each offense, and each day's violation is a separate offense.

Sincerely

Richard A. Suggs
Geologist

SUNDRY NOTICES AND REPORTS ON WELLS - FORM 4

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5749 (09-2006)

JUN 2012 RECEIVED ND OIL & GAS DIVISION

Well File No. 23105

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

☐ Notice of Intent	Approximate Start Date	☐ Drilling Prognosis	☐ Spill Report
☐ Report of Work Done	Date Work Completed	☐ Redrilling or Repair	☐ Shooting
☐ Notice of Intent to Begin a Workover Project that may Qualify for a Tax Exemption Pursuant to NDCC Section 57-51.1-03.	Approximate Start Date	☐ Casing or Liner	☐ Acidizing
		☐ Plug Well	☐ Fracture Treatment
		☐ Supplemental History	☐ Change Production Method
		☐ Temporarily Abandon	☐ Reclamation
		☑ Other	OH Logging Waiver

Well Name and Number					
LUNKER FEDERAL 2-33-4H					
Footages		Qtr-Qtr	Section	Township	Range
250 F N L	1200 F WL	NWNW	33	152 N	91 W
Field	Pool	County			
Van Hook	Bakken	Mountrail			

24-HOUR PRODUCTION RATE

Before		After	
Oil	Bbls	Oil	Bbls
Water	Bbls	Water	Bbls
Gas	MCF	Gas	MCF

Name of Contractor(s)			
none			
Address	City	State	Zip Code

DETAILS OF WORK

Slawson Exploration Company, Inc. (SECI) respectfully requests an open hole logging waiver for the proposed ~~well~~ OH Logs Run Lunker Federal 2-33-4H well. It is located less than a mile from the Lunker Federal 1-33-4H well (W18499), which was drilled with a Triple Combo open hole log suite. Geologic control for the Lunker Federal 2-33-4H will be achieved utilizing mudlogs and the gamma ray log from the MWD tool to be run in this well. A CBL/GR log will also be run from the KOP to 100' above TOC and to the surface with the GR.

*Open hole log waiver request DENIED: Offsetting wells do not meet open hole logging requirements. Therefore, SLAWSON EXPLORATION COMPANY, INC. must run open hole logs to include a porosity and resistivity log from KOP to the base of the surface casing.

Company		Telephone Number
Slawson Exploration Company, Inc.		(720) 457-9821
Address		
1675 Broadway, Suite 1600		
City	State	Zip Code
Denver	CO	80202
Signature	Printed Name	
	Khem Suthiwan	
Title	Date	
Permitting Manager	May 22, 2012	
Email Address		
ksuthiwan@slawsoncompanies.com		

FOR STATE USE ONLY

☑ Received	☐ Approved
Date	6-8-2012
By	
Title	Richard A. Suggs Geologist

Oil and Gas Division

Lynn D. Helms - Director Bruce E. Hicks - Assistant Director

Department of Mineral Resources

Lynn D. Helms - Director

North Dakota Industrial Commission

www.oilgas.nd.gov

June 8, 2012

Tex Hall, Chairman
Three Affiliated Tribes
404 Frontage Road
New Town, ND 58763

RE: WELL PERMITTED ON FORT BERTHOLD RESERVATION
LUNKER FEDERAL 2-33-4H
NWNW Section 33-152N-91W
Mountrail County
NDIC File No. 23105

Chairman Hall:

Please be advised that SLAWSON EXPLORATION COMPANY, INC. was issued the above captioned permit on June 8, 2012 and will remain in effect for a period of one year. In addition, it was permitted with a 1280 acre spacing unit in Section 33 T152 R91 Section 4 T151 R91 via Commission Order 18903.

Should you have any questions, feel free to contact me.

Sincerely,

Todd L. Holweger
Mineral Resources Permit Manager

cc: Tax Commissioner
Field Inspector

Oil and Gas Division

Lynn D. Helms - Director Bruce E. Hicks - Assistant Director

Department of Mineral Resources

Lynn D. Helms - Director

North Dakota Industrial Commission

www.oilgas.nd.gov

June 8, 2012

Khem Suthiwan
Permitting Manager
SLAWSON EXPLORATION COMPANY, INC.
1675 Broadway, Suite 1600
Denver, CO 80202

RE: HORIZONTAL WELL
LUNKER FEDERAL 2-33-4H
NWNW Section 33-152N-91W
Mountrail County
Well File # 23105

Dear Khem:

Pursuant to Commission Order No. 18903, approval to drill the above captioned well is hereby given. The approval is granted on the condition that all portions of the well bore not isolated by cement, be no closer than the 200' setback from the north & south boundaries and 500' setback from the east & west boundaries within the 1280 acre spacing unit consisting of Section 33 T152 R91 Section 4 T151 R91.

PERMIT STIPULATIONS: SLAWSON EXPLORATION COMPANY, INC. must run open hole logs to include a porosity and resistivity log from KOP to the base of the surface casing. SLAWSON EXPLORATION must contact NDIC Field Inspector Robert Garbe at 701-720-3262 prior to location construction.

Drilling pit
NDAC 43-02-03-19.4 states that "a pit may be utilized to bury drill cuttings and solids generated during well drilling and completion operations, providing the pit can be constructed, used and reclaimed in a manner that will prevent pollution of the land surface and freshwaters. Reserve and circulation of mud system through earthen pits are prohibited. All pits shall be inspected by an authorized representative of the director prior to lining and use. Drill cuttings and solids must be stabilized in a manner approved by the director prior to placement in a cuttings pit."

Form 1 Changes & Hard Lines
Any changes, shortening of casing point or lengthening at Total Depth must have prior approval by the NDIC. The proposed directional plan is at a legal location. Based on the azimuth of the proposed lateral the maximum legal coordinate from the well head is: 10105 S.

Location Construction Commencement (Three Day Waiting Period)
Operators shall not commence operations on a drill site until the 3rd business day following publication of the approved drilling permit on the NDIC - OGD Daily Activity Report. If circumstances require operations to commence before the 3rd business day following publication on the Daily Activity Report, the waiting period may be waived by the Director. Application for a waiver must be by sworn affidavit providing the information necessary to evaluate the extenuating circumstances, the factors of NDAC 43-02-03-16.2 (1), (a)-(f), and any other information that would allow the Director to conclude that in the event another owner seeks revocation of the drilling permit, the applicant should retain the permit.

Permit Fee & Notification
Payment was received in the amount of $100 via credit card. It is requested that notification be given immediately upon the spudding of the well. This information should be relayed to the Oil & Gas Division, Bismarck, via telephone. The following information must be included: Well name, legal location, permit number, drilling contractor, company representative, date and time of spudding. Office hours are 8:00 a.m. to 12:00 p.m. and 1:00 p.m. to 5:00 p.m. Central Time. Our telephone number is (701) 328-8020, leave a message if after hours or on the weekend.

Survey Requirements for Horizontal, Horizontal Re-entry, and Directional Wells

NDAC Section 43-02-03-25 (Deviation Tests and Directional Surveys) states in part (that) the survey contractor shall file a certified copy of all surveys with the director free of charge within thirty days of completion. Surveys must be submitted as one electronic copy, or in a form approved by the director. However, the director may require the directional survey to be filed immediately after completion if the survey is needed to conduct the operation of the director's office in a timely manner. Certified surveys must be submitted via email in one adobe document, with a certification cover page to certsurvey@nd.gov.

Survey points shall be of such frequency to accurately determine the entire location of the well bore.

Specifically, the Horizontal and Directional well survey frequency is 100 feet in the vertical, 30 feet in the curve (or when sliding) and 90 feet in the lateral.

Confidential status

Your request for confidential status of all information furnished to the Director, or his representatives, is hereby granted. Such information, except production runs, shall remain confidential for six months commencing on the date the well is spud.

Confidential status notwithstanding, the Director and his representatives shall have access to all well records wherever located. Your company personnel, or any person performing work for your company shall permit the Director and his representatives to come upon any lease, property, well, or drilling rig operated or controlled by them, complying with all safety rules, and to inspect the records and operation of such wells and to have access at all times to any and all records of wells. The Commission's field personnel periodically inspect producing and drilling wells. Any information regarding such wells shall be made available to them at any time upon request. The information so obtained by the field personnel shall be maintained in strict confidence and shall be available only to the Commission and its staff.

Surface casing cement

Tail cement utilized on surface casing must have a minimum compressive strength of 500 psi within 12 hours, and tail cement utilized on production casing must have a minimum compressive strength of 500 psi before drilling the plug or initiating tests.

Logs

NDAC Section 43-02-03-31 requires the running of a Cement Bond Log from which the presence of cement can be determined in every well in which production or intermediate casing has been set and a Gamma Ray Log must be run from total depth to ground level elevation of the well bore. All logs must be submitted as one paper copy and one digital copy in LAS (Log ASCII) format, or a format approved by the Director. Image logs that include, but are not limited to, Mud Logs, Cement Bond Logs, and Cyberlook Logs, cannot be produced in their entirety as LAS (Log ASCII) files. To create a solution and establish a standard format for industry to follow when submitting image logs, the Director has given approval for the operator to submit an image log as a TIFF (*.tif) formatted file. The TIFF (*.tif) format will be accepted only when the log cannot be produced in its entirety as a LAS (Log ASCII) file format. The digital copy may be submitted on a standard CD, or attached to an email sent to digitallogs@nd.gov Thank you for your cooperation.

Sincerely,

David Burns
Engineering Technician III

APPLICATION FOR PERMIT TO DRILL HORIZONTAL WELL - FORM 1H

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 54269 (08-2005)

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

Type of Work	Type of Well	Approximate Date Work Will Start	Confidential Status
New Location	Oil & Gas	06 / 15 / 2012	Yes

Operator	Telephone Number
SLAWSON EXPLORATION COMPANY, INC.	720-457-9821

Address	City	State	Zip Code
1675 Broadway, Suite 1600	Denver	CO	80202

☑ Notice has been provided to the owner of any permanently occupied dwelling within 1,320 feet.

☑ This well is not located within five hundred feet of an occupied dwelling.

WELL INFORMATION (If more than one lateral proposed, enter data for additional laterals on page 2)

Well Name	Well Number
LUNKER FEDERAL	2-33-4H

Surface Footages	Qtr-Qtr	Section	Township	Range	County
250 F N L 1200 F W L	NWNW	33	152 N	91 W	Mountrail
Longstring Casing Point Footages					
719 F N L 1288 F W L	NWNW	33	152 N	91 W	Mountrail
Longstring Casing Point Coordinates From Well Head	**Azimuth**	**Longstring Total Depth**			
469 S From WH 88 E From WH	169.4 °	9984 Feet MD	9711 Feet TVD		
Bottom Hole Footages From Nearest Section Line					
248 F S L 1320 F W L	SESW	4	151 N	91 W	Mountrail

Bottom Hole Coordinates From Well Head	KOP Lateral 1	Azimuth Lateral 1	Estimated Total Depth Lateral 1
10057 S From WH 120 E From WH	9234 Feet MD	180 °	19575 Feet MD 9741 Feet TVD

Latitude of Well Head	Longitude of Well Head	NAD Reference	Description of (Subject to NDIC Approval)
47 ° 56 ' 53.65 "	-102 ° 20 ' 19.68 "	NAD83	Spacing Unit: S33 T152 R91 & S4 T151 R91

Ground Elevation	Acres in Spacing/Drilling Unit	Spacing/Drilling Unit Setback Requirement	Industrial Commission Order
1874 Feet Above S.L.	1280	200 Feet N/S 500 Feet E/W	18903

North Line of Spacing/Drilling Unit	South Line of Spacing/Drilling Unit	East Line of Spacing/Drilling Unit	West Line of Spacing/Drilling Unit
5279 Feet	5279 Feet	10557 Feet	10556 Feet

Objective Horizons	Pierre Shale Top
Bakken	1649

Proposed	Size	Weight	Depth	Cement Volume	
Surface Casing	9 - 5/8 "	36 Lb./Ft.	1749 Feet	567 Sacks	NOTE: Surface hole must be drilled with fresh water and surface casing must be cemented back to surface.

Proposed	Size	Weight(s)	Longstring Total Depth	Cement Volume	Cement Top	Top Dakota Sand
Longstring Casing	7 - 0 "	29 & 32 Lb./Ft.	9984 Feet MD 9711 Feet TVD	645 Sacks	4188 Feet	4688 Feet

Base Last Charles Salt (If Applicable)	
8060 Feet	NOTE: Intermediate or longstring casing string must be cemented above the top Dakota Group Sand.

Proposed Logs
OH Log Waiver - CBL w/ GR and CCL from KOP to 100' above the TOC & GR to surface

Drilling Mud Type (Vertical Hole - Below Surface Casing)	Drilling Mud Type (Lateral)
Invert	Other - See Comments

Survey Type in Vertical Portion of Well	Survey Frequency: Build Section	Survey Frequency: Lateral	Survey Contractor
MWD Every 100 Feet	30 Feet	90 Feet	Directional Drilling Co.

NOTE: A Gamma Ray log must be run to ground surface and a CBL must be run on intermediate or longstring casing string if set.

Surveys are required at least every 30 feet in the build section and every 90 feet in the lateral section of a horizontal well. Measurement inaccuracies are not considered when determining compliance with the spacing/drilling unit boundary setback requirement except in the following scenarios: 1) When the angle between the well bore and the respective boundary is 10 degrees or less; or 2) If industry standard methods and equipment are not utilized. Consult the applicable field order for exceptions.

If measurement inaccuracies are required to be considered, a 2° MWD measurement inaccuracy will be applied to the horizontal portion of the well bore. This measurement inaccuracy is applied to the well bore from KOP to TD.

REQUIRED ATTACHMENTS: Certified surveyor's plat, horizontal section plat, estimated geological tops, proposed mud/cementing plan, directional plot/plan, $100 fee.

See Page 2 for Comments section and signature block.

COMMENTS, ADDITIONAL INFORMATION, AND/OR LIST OF ATTACHMENTS

No occupied dwelling within 1,320 ft. Lateral will be drilled with CaCl water unless pressure is encountered, then will switch to 80/20 invert mud. KB @ 1,899'. Certified surveyors well location plat, horizontal sections, pad layout, pad x-sections, topo map, proposed directional survey & plots, and drilling program will be emailed. Slawson only uses frac strings in an emergency situation.

Lateral 2

KOP Lateral 2 Feet MD	Azimuth Lateral 2 °	Estimated Total Depth Lateral 2 Feet MD	Feet TVD	KOP Coordinates From Well Head From WH	From WH
Formation Entry Point Coordinates From Well Head From WH	From WH	Bottom Hole Coordinates From Well Head From WH	From WH		
KOP Footages From Nearest Section Line F L	F L	Qtr-Qtr	Section	Township N	Range W	County
Bottom Hole Footages From Nearest Section Line F L	F L	Qtr-Qtr	Section	Township N	Range W	County

Lateral 3

KOP Lateral 3 Feet MD	Azimuth Lateral 3 °	Estimated Total Depth Lateral 3 Feet MD	Feet TVD	KOP Coordinates From Well Head From WH	From WH
Formation Entry Point Coordinates From Well Head From WH	From WH	Bottom Hole Coordinates From Well Head From WH	From WH		
KOP Footages From Nearest Section Line F L	F L	Qtr-Qtr	Section	Township N	Range W	County
Bottom Hole Footages From Nearest Section Line F L	F L	Qtr-Qtr	Section	Township N	Range W	County

Lateral 4

KOP Lateral 4 Feet MD	Azimuth Lateral 4 °	Estimated Total Depth Lateral 4 Feet MD	Feet TVD	KOP Coordinates From Well Head From WH	From WH
Formation Entry Point Coordinates From Well Head From WH	From WH	Bottom Hole Coordinates From Well Head From WH	From WH		
KOP Footages From Nearest Section Line F L	F L	Qtr-Qtr	Section	Township N	Range W	County
Bottom Hole Footages From Nearest Section Line F L	F L	Qtr-Qtr	Section	Township N	Range W	County

Lateral 5

KOP Lateral 5 Feet MD	Azimuth Lateral 5 °	Estimated Total Depth Lateral 5 Feet MD	Feet TVD	KOP Coordinates From Well Head From WH	From WH
Formation Entry Point Coordinates From Well Head From WH	From WH	Bottom Hole Coordinates From Well Head From WH	From WH		
KOP Footages From Nearest Section Line F L	F L	Qtr-Qtr	Section	Township N	Range W	County
Bottom Hole Footages From Nearest Section Line F L	F L	Qtr-Qtr	Section	Township N	Range W	County

I hereby swear or affirm the information provided is true, complete and correct as determined from all available records.	Date 05 / 22 / 2012
ePermit	Printed Name Khem Suthiwan	Title Permitting Manager

FOR STATE USE ONLY

Permit and File Number 23105	API Number 33 - 061 - 02154
Field VAN HOOK	
Pool BAKKEN	Permit Type DEVELOPMENT

FOR STATE USE ONLY

Date Approved 6 / 8 / 2012
By David Burns
Title Engineering Technician III

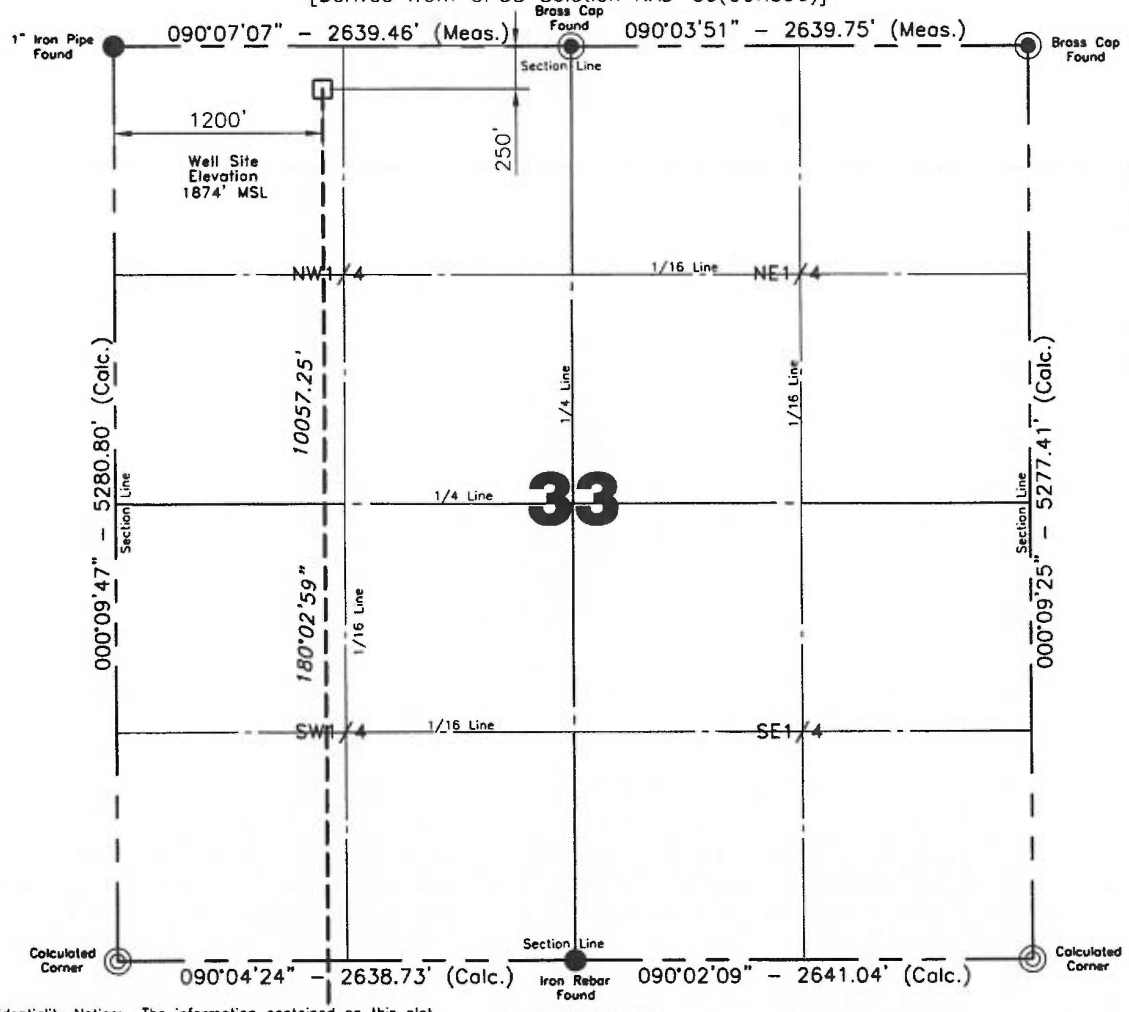
WELL LOCATION PLAT

Slawson Exploration Company, Inc.
1675 Broadway, Suite 1600 Denver, Colorado 80202

Lunker Federal 2-33-4H

250 feet from the north line and 1200 feet from the west line (surface location)
Section 33, T. 152 N., R. 91 W., 5th P.M.
250 feet from the south line and 1200 feet from the west line (bottom location)
Section 4, T. 151 N., R. 91 W., 5th P.M.
Mountrail County, North Dakota
Surface owner @ well site – Frances & Dorothy Ventsch Etal

Latitude 47°56'53.65" North; Longitude 102°20'19.68" West (surface location)
Latitude 47°55'14.42" North; Longitude 102°20'19.81" West (bottom hole location)
[Derived from OPUS Solution NAD-83(CORS96)]



Scale 1"=1000'

Confidentiality Notice: The information contained on this plat is legally privileged and confidential information intended only for the use of recipients. If you are not the intended recipients, you are hereby notified that any use, dissemination, distribution or copying of this information is strictly prohibited.

NOTE: All land corners are assumed unless otherwise noted. The well location shown hereon is not an as-built location.

I, Myron J. Kadrmas, Professional Land Surveyor, N.D. No. 3758, do hereby certify that the survey plat shown hereon was made by me, or under my direction, from notes made in the field, and the same is true and correct to the best of my knowledge and belief.

Brandon Weber 1/28/2011
Surveyed By Date

MYRON J. KADRMAS
REGISTERED LAND SURVEYOR
L.S. 3758
2-10-11
NORTH DAKOTA
DATE

Vertical Control Datum Used
Sea-Level Datum of NAVD 88
Based on elevation derived from OPUS Solution on GPS*KLJ-1 (iron rebar) Located a distance of 5138.58' on an azimuth of 001°44'64" from the NW corner of Section 28 T.152N., R.91W., 5th P.M. being at 2042.51' Elevation MSL.

Project No. 3711148
Book OW-242 Pg. 72 Staking

Professional Consulting Engineers and Surveyors
Registered in
North Dakota, South Dakota
Montana, Wyoming & Minnesota
Tele-Fax No. 701-483-2795
Bus. Phone No. 701-483-1284
P.O. Box 290
677 27th Ave. E.
Dickinson, North Dakota 58602
Certificate of Authorization #C-061

Kadrmas Lee & Jackson
Engineers Surveyors Planners

Feb 09, 2011 – 10:56am – J:\oilfield\Slawson\3711148\Cadd\EP\3711148BASO1.DWG

1675 Broadway, Ste. 1600
Denver, Co. 80202

SLAWSON exploration company, inc.

Phone # 303-592-8880
Fax: 303-592-8881
Log Fax:

GENERAL WELL INFORMATION					
LEASE NAME AND NUMBER	Lunker Federal 2-33-4H - single-lateral Bakken producer with stage-frac completion				
ORIGINAL GL:	1,874'	FOOTAGE CALLS - SURFACE HOLE	250' FNL		1,200' FWL
FINAL PAD ELEVATION	1,875'	SURFACE HOLE LOCATION	NWNW	33, 152N,	91W
KB(24')	1,899'	BOTTOM HOLE LOCATION	SWSW	4, 151N,	91W
PROPOSED TVD	9,741'	LATITUDE	47° 56' 53.65" N		
PROPOSED TMD	19,575'	LONGITUDE	102° 20' 19.68" W		
LATERAL LENGTH (FT.)	9,592'	COUNTY/STATE	Mountrail CO, ND		
FIELD	Van Hook Infill				

DIRECTIONS TO WELL: From the intersection of Hwy 23 and Hwy 8 travel south on Hwy 8 approx. 2.0 miles to the upgraded section line road between Sec. 28 and Sec.33, turn left (east) onto the section line road and travel 0.23 miles to the pad access road and location on the left (south side of the road).

ESTIMATED TOPS	SUBSEA	TVD	ESTIMATED TOPS	SUBSEA	TVD
Pierre/base Foxhills	250'	1,649'	Charles	-5,672'	7,571'
Dakota (marine)	-2,789'	4,688'	base last Charles salt	-6,161'	8,060'
Dunham Salt	-4,107'	6,006'	Mission Canyon	-6,339'	8,238'
Base Dunham Salt	-4,177'	6,076'	Lodgepole	-6,944'	8,843'
Pine Salt	-4,423'	6,322'	Upper Bakken shale	-7,760'	9,659'
Base Pine Salt	-4,460'	6,359'	Top of Target	-7,788'	9,687'
Opeche	-4,471'	6,370'	Target	-7,798'	9,711'
Minnelussa	-4,741'	6,640'	Base of Target	-7,808'	9,707'
Kibbey Lime	-5,519'	7,418'			

MUD PROGRAM					
Start at (ft.)	Change at (ft.)	Type	Viscosity	Weight	Fluid Loss	LCM
0	1,749'	(Through Surface Casing Depth)	fresh water	28-32	8.34	NC	--
1,749'	7" csg point		80/20 invert	45-50	9.6-10.5	5-10	--
7" csg point	Total MD		Brine		9.2-10.2	NC	--
If overpressured			80/20 invert	28	11.5 - 13	5-10	--

Maximum anticipated bottom hole pressure is 4,205#; BOPs to be tested to 5000psi.

LOGGING PROGRAM

Open Hole	OH Log Waiver
Cased Hole	CBL/GR/CCL, GR to surface.

BIT PROGRAM

Hole Size	Casing	Bit Type	Model	Manufacturer
13-1/2"	9⅝"	Roller-Cone		Retip
8-3/4" Vertical	7"	PDC	655ZX	SEC
8-3/4" Curve	7"	PDC	3641	SEC
6"	4½"	PDC	643	SEC

DIRECTIONAL PROGRAM

KOP	9,220'
Build rate	12.0°/100'
Lateral length, (ft.)	9,592'
Azimuth	169.35°
Target zone top (TVD)	9,687'
Landing point (TVD)	9,711'
Target zone bottom (TVD)	9,707'
Total MD	19,575'

***** SEE ATTACHED DIRECTIONAL PLAN

CASING PROGRAM

SURFACE CASING:			start	end	footage
9-5/8"	36#	K55	'	1,749'	1,749'
				'	
PRODUCTION CASING:			start	end	footage
7"	29#	P-110	'	5,852'	5,852'
7"	32#	P-110	5,852'	7,725'	1,873'
7"	29#	P-110	7,725'	9,984'	2,259'
Total 29#	8,111'	Total 32#	1,873'		
LINER LENGTH:			start	end	Length
4-1/2"	11.6#	P-110	9,220'	19,545'	10,295'

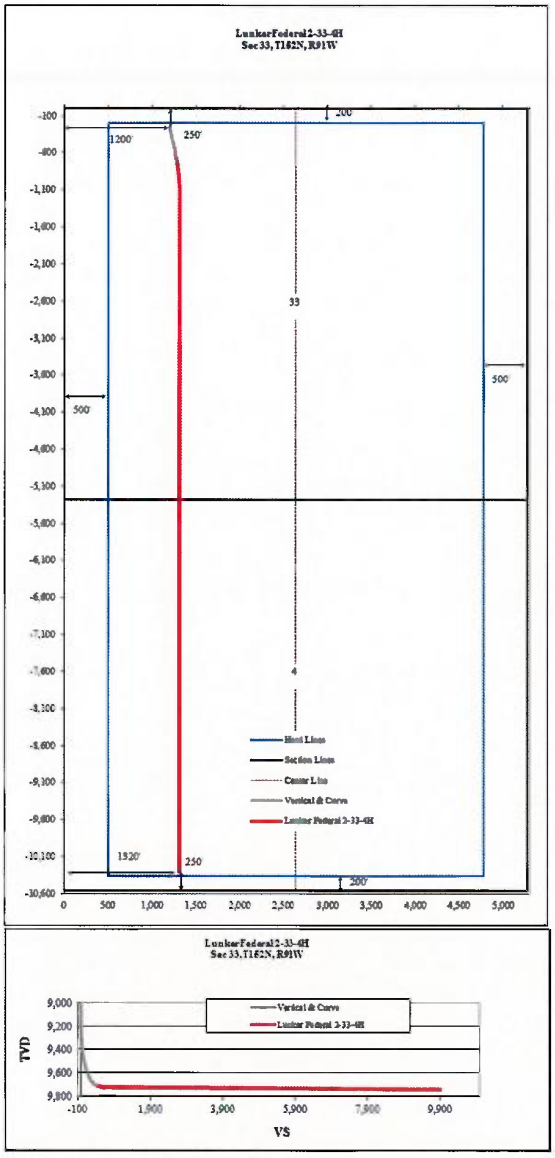
Mech Packer assembly on 4-1/2" liner - Packer depths to be provided at TD. The sleeves and packers will provided when run.

CEMENT PROGRAM	Size	Instructions
SURFACE CASING	9⅝"	Cement to surface with **305 SX** "G" and **262 SX** "G" tail; **1,368 cu.ft.** total
Use 60% excess		
PRODUCTION CASING	7"	Cement w/ **273 sx** lite Pozmix (Yield: 2.56 ft3/sx) lead and **372 sx** Class G (Yield: 1.65 ft3/sx) tail. Calculated cement top 500' above Dakota (4,188'). Lead coverage from 500' above Dakota to 150' above Charles, Tail coverage from 150' above Charles to 7" shoe.
Use 30% excess and a 9" hole		
See Drilling Procedure for Float Equipment		
Recommendation		

SLAWSON CONTACT INFORMATION

Engineering:	Office	Home	Cell
Mark McCallister	720-897-8758	303-730-9979	303-748-1602
Matt Houston	720-897-8759	512-944-5528	512-944-5528
Geology:			
Bob Bogle	720-897-8756	303-773-1706	303-523-5607

SLAWSON
exploration company, inc.



The SHL is 250' FNL & 1,200' FWL (NWNW), Section 33, T152N, R91W, Mountrail County, ND. The state setback is 500' from east and west lines and 200' from north and south lines.

7" Casing: 8-3/4" hole: KOP at 9,234'. Build curve at **12°/100'** to 90° inclination at 9,984' MD **(9,711' TVD)** at an azimuth of 169.35°. Set 7" casing (719' FNL & 1,288' FWL, NWNW, Section 33, T152N, R91W).

South Lateral: Drill a 6" horizontal well and decrease the azimuth at **3°/100'** to an azimuth of 180.00° to TD at a depth of 19,575' MD **(9,741' TVD)**, 250' FSL & 1,320' FWL (SWSW) Section 4, T151N, R91W. Expect an inclination of 89.88°. Total 6" lateral is 9,592'.

Lunker Federal 2-33-4H

KB = 1,899' KOP = 9,234' TARGET = 9,711' TVD

MD	Incl.	Azi.	TVD	Based on True North North	East	DLS	Vertical Section	UTM N	UTM E	
0.00	0.00	169.35	0.00	0.00	0.00	0.00	0.00	-250.00	1,200.00	
9,200.00	0.00	169.35	9,200.00	0.00	0.00	0.00	0.00	-250.00	1,200.00	
9,233.50	**0.00**	**169.35**	**9,233.50**	**0.00**	**0.00**	**0.00**	**0.00**	**-250.00**	**1,200.00**	**KOP**
9,283.50	6.00	169.35	9,283.36	-2.57	0.48	12.00	2.61	-252.57	1,200.48	
9,333.50	12.00	169.35	9,332.68	-10.25	1.92	12.00	10.43	-260.25	1,201.92	
9,383.50	18.00	169.35	9,380.91	-22.95	4.31	12.00	23.35	-272.95	1,204.31	
9,433.50	24.00	169.35	9,427.53	-40.54	7.62	12.00	41.25	-290.54	1,207.62	
9,483.50	30.00	169.35	9,472.02	-62.82	11.81	12.00	63.92	-312.82	1,211.81	
9,533.50	36.00	169.35	9,513.90	-89.55	16.83	12.00	91.12	-339.55	1,216.83	
9,583.50	42.00	169.35	9,552.70	-120.43	22.64	12.00	122.54	-370.43	1,222.64	
9,633.50	48.00	169.35	9,588.01	-155.13	29.16	12.00	157.85	-405.13	1,229.16	
9,683.50	54.00	169.35	9,619.43	-193.27	36.33	12.00	196.65	-443.27	1,236.33	
9,733.50	60.00	169.35	9,646.62	-234.43	44.07	12.00	238.54	-484.43	1,244.07	
9,783.50	66.00	169.35	9,669.29	-278.15	52.29	12.00	283.02	-528.15	1,252.29	
9,833.50	72.00	169.35	9,687.18	-323.96	60.90	12.00	329.63	-573.96	1,260.90	
9,883.50	78.00	169.35	9,700.10	-371.36	69.81	12.00	377.86	-621.36	1,269.81	
9,933.50	84.00	169.35	9,707.91	-419.83	78.92	12.00	427.18	-669.83	1,278.92	
9,983.50	**90.00**	**169.35**	**9,710.52**	**-468.83**	**88.13**	**12.00**	**477.04**	**-718.83**	**1,288.13**	**EOC, 7" Csg**

Lunker Federal 2-33-4H

9,983.50	**90.00**	**169.35**	**9,710.52**	**-468.83**	**88.13**	**12.00**	**477.04**	**-718.83**	**1,288.13**	**EOC, 7" Csg**
10,083.50	89.88	172.35	9,721.10	-566.60	101.19	6.12	575.54	-816.60	1,301.19	
10,183.50	89.88	175.35	9,721.31	-665.99	111.90	3.00	675.20	-915.99	1,311.90	
10,283.50	89.88	178.35	9,721.31	-665.99	111.90	3.00	675.20	-915.99	1,311.90	
10,383.50	89.88	180.00	9,721.73	-865.66	120.00	2.32	872.93	-1,115.66	1,320.00	
10,483.50	89.88	180.00	9,721.94	-965.66	120.00	0.00	971.21	-1,215.66	1,320.00	
10,583.50	89.88	180.00	9,722.15	-1,065.66	120.00	0.00	1,069.48	-1,315.66	1,320.00	
10,683.50	89.88	180.00	9,722.36	-1,165.66	120.00	0.00	1,167.76	-1,415.66	1,320.00	
10,783.50	89.88	180.00	9,722.57	-1,265.66	120.00	0.00	1,266.04	-1,515.66	1,320.00	
10,883.50	89.88	180.00	9,722.78	-1,365.66	120.00	0.00	1,364.32	-1,615.66	1,320.00	
10,983.50	89.88	180.00	9,722.99	-1,465.66	120.00	0.00	1,462.60	-1,715.66	1,320.00	
11,083.50	89.88	180.00	9,723.20	-1,565.66	120.00	0.00	1,560.87	-1,815.66	1,320.00	
11,183.50	89.88	180.00	9,723.41	-1,665.66	120.00	0.00	1,659.15	-1,915.66	1,320.00	
11,283.50	89.88	180.00	9,723.62	-1,765.66	120.00	0.00	1,757.43	-2,015.66	1,320.00	
11,383.50	89.88	180.00	9,723.83	-1,865.66	120.00	0.00	1,855.71	-2,115.66	1,320.00	
11,483.50	89.88	180.00	9,724.04	-1,965.66	120.00	0.00	1,953.99	-2,215.66	1,320.00	
11,583.50	89.88	180.00	9,724.25	-2,065.66	120.00	0.00	2,052.27	-2,315.66	1,320.00	
11,683.50	89.88	180.00	9,724.46	-2,165.66	120.00	0.00	2,150.54	-2,415.66	1,320.00	
11,783.50	89.88	180.00	9,724.67	-2,265.66	120.00	0.00	2,248.82	-2,515.66	1,320.00	
11,883.50	89.88	180.00	9,724.88	-2,365.66	120.00	0.00	2,347.10	-2,615.66	1,320.00	
11,983.50	89.88	180.00	9,725.09	-2,465.66	120.00	0.00	2,445.38	-2,715.66	1,320.00	
12,083.50	89.88	180.00	9,725.30	-2,565.66	120.00	0.00	2,543.66	-2,815.66	1,320.00	
12,183.50	89.88	180.00	9,725.51	-2,665.66	120.00	0.00	2,641.93	-2,915.66	1,320.00	
12,283.50	89.88	180.00	9,725.72	-2,765.66	120.00	0.00	2,740.21	-3,015.66	1,320.00	
12,383.50	89.88	180.00	9,725.93	-2,865.66	120.00	0.00	2,838.49	-3,115.66	1,320.00	
12,483.50	89.88	180.00	9,726.14	-2,965.66	120.00	0.00	2,936.77	-3,215.66	1,320.00	
12,583.50	89.88	180.00	9,726.35	-3,065.66	120.00	0.00	3,035.05	-3,315.66	1,320.00	
12,683.50	89.88	180.00	9,726.56	-3,165.66	120.00	0.00	3,133.32	-3,415.66	1,320.00	
12,783.50	89.88	180.00	9,726.77	-3,265.66	120.00	0.00	3,231.60	-3,515.66	1,320.00	
12,883.50	89.88	180.00	9,726.98	-3,365.66	120.00	0.00	3,329.88	-3,615.66	1,320.00	
12,983.50	89.88	180.00	9,727.19	-3,465.66	120.00	0.00	3,428.16	-3,715.66	1,320.00	
13,083.50	89.88	180.00	9,727.40	-3,565.66	120.00	0.00	3,526.44	-3,815.66	1,320.00	
13,183.50	89.88	180.00	9,727.61	-3,665.66	120.00	0.00	3,624.72	-3,915.66	1,320.00	
13,283.50	89.88	180.00	9,727.82	-3,765.66	120.00	0.00	3,722.99	-4,015.66	1,320.00	
13,383.50	89.88	180.00	9,728.03	-3,865.66	120.00	0.00	3,821.27	-4,115.66	1,320.00	
13,483.50	89.88	180.00	9,728.24	-3,965.66	120.00	0.00	3,919.55	-4,215.66	1,320.00	
13,583.50	89.88	180.00	9,728.45	-4,065.66	120.00	0.00	4,017.83	-4,315.66	1,320.00	
13,683.50	89.88	180.00	9,728.66	-4,165.66	120.00	0.00	4,116.11	-4,415.66	1,320.00	
13,783.50	89.88	180.00	9,728.87	-4,265.66	120.00	0.00	4,214.38	-4,515.66	1,320.00	
13,883.50	89.88	180.00	9,729.08	-4,365.66	120.00	0.00	4,312.66	-4,615.66	1,320.00	
13,983.50	89.88	180.00	9,729.29	-4,465.66	120.00	0.00	4,410.94	-4,715.66	1,320.00	
14,083.50	89.88	180.00	9,729.50	-4,565.66	120.00	0.00	4,509.22	-4,815.66	1,320.00	
14,183.50	89.88	180.00	9,729.71	-4,665.66	120.00	0.00	4,607.50	-4,915.66	1,320.00	
14,283.50	89.88	180.00	9,729.92	-4,765.66	120.00	0.00	4,705.78	-5,015.66	1,320.00	
14,383.50	89.88	180.00	9,730.13	-4,865.66	120.00	0.00	4,804.05	-5,115.66	1,320.00	
14,483.50	89.88	180.00	9,730.34	-4,965.66	120.00	0.00	4,902.33	-5,215.66	1,320.00	
14,583.50	89.88	180.00	9,730.55	-5,065.66	120.00	0.00	5,000.61	-5,315.66	1,320.00	

14,683.50	89.88	180.00	9,730.76	-5,165.66	120.00	0.00	5,098.89	-5,415.66	1,320.00	
14,783.50	89.88	180.00	9,730.97	-5,265.66	120.00	0.00	5,197.17	-5,515.66	1,320.00	
14,883.50	89.88	180.00	9,731.18	-5,365.66	120.00	0.00	5,295.44	-5,615.66	1,320.00	
14,983.50	89.88	180.00	9,731.39	-5,465.66	120.00	0.00	5,393.72	-5,715.66	1,320.00	
15,083.50	89.88	180.00	9,731.60	-5,565.66	120.00	0.00	5,492.00	-5,815.66	1,320.00	
15,183.50	89.88	180.00	9,731.81	-5,665.66	120.00	0.00	5,590.28	-5,915.66	1,320.00	
15,283.50	89.88	180.00	9,732.02	-5,765.66	120.00	0.00	5,688.56	-6,015.66	1,320.00	
15,383.50	89.88	180.00	9,732.23	-5,865.66	120.00	0.00	5,786.83	-6,115.66	1,320.00	
15,483.50	89.88	180.00	9,732.44	-5,965.66	120.00	0.00	5,885.11	-6,215.66	1,320.00	
15,583.50	89.88	180.00	9,732.65	-6,065.66	120.00	0.00	5,983.39	-6,315.66	1,320.00	
15,683.50	89.88	180.00	9,732.86	-6,165.66	120.00	0.00	6,081.67	-6,415.66	1,320.00	
15,783.50	89.88	180.00	9,733.07	-6,265.66	120.00	0.00	6,179.95	-6,515.66	1,320.00	
15,883.50	89.88	180.00	9,733.28	-6,365.66	120.00	0.00	6,278.23	-6,615.66	1,320.00	
15,983.50	89.88	180.00	9,733.49	-6,465.66	120.00	0.00	6,376.50	-6,715.66	1,320.00	
16,083.50	89.88	180.00	9,733.70	-6,565.66	120.00	0.00	6,474.78	-6,815.66	1,320.00	
16,183.50	89.88	180.00	9,733.91	-6,665.66	120.00	0.00	6,573.06	-6,915.66	1,320.00	
16,283.50	89.88	180.00	9,734.12	-6,765.66	120.00	0.00	6,671.34	-7,015.66	1,320.00	
16,383.50	89.88	180.00	9,734.33	-6,865.66	120.00	0.00	6,769.62	-7,115.66	1,320.00	
16,483.50	89.88	180.00	9,734.54	-6,965.66	120.00	0.00	6,867.89	-7,215.66	1,320.00	
16,583.50	89.88	180.00	9,734.75	-7,065.66	120.00	0.00	6,966.17	-7,315.66	1,320.00	
16,683.50	89.88	180.00	9,734.96	-7,165.66	120.00	0.00	7,064.45	-7,415.66	1,320.00	
16,783.50	89.88	180.00	9,735.17	-7,265.66	120.00	0.00	7,162.73	-7,515.66	1,320.00	
16,883.50	89.88	180.00	9,735.38	-7,365.66	120.00	0.00	7,261.01	-7,615.66	1,320.00	
16,983.50	89.88	180.00	9,735.59	-7,465.66	120.00	0.00	7,359.29	-7,715.66	1,320.00	
17,083.50	89.88	180.00	9,735.80	-7,565.66	120.00	0.00	7,457.56	-7,815.66	1,320.00	
17,183.50	89.88	180.00	9,736.01	-7,665.66	120.00	0.00	7,555.84	-7,915.66	1,320.00	
17,283.50	89.88	180.00	9,736.22	-7,765.66	120.00	0.00	7,654.12	-8,015.66	1,320.00	
17,383.50	89.88	180.00	9,736.43	-7,865.66	120.00	0.00	7,752.40	-8,115.66	1,320.00	
17,483.50	89.88	180.00	9,736.64	-7,965.66	120.00	0.00	7,850.68	-8,215.66	1,320.00	
17,583.50	89.88	180.00	9,736.85	-8,065.66	120.00	0.00	7,948.95	-8,315.66	1,320.00	
17,683.50	89.88	180.00	9,737.06	-8,165.66	120.00	0.00	8,047.23	-8,415.66	1,320.00	
17,783.50	89.88	180.00	9,737.27	-8,265.66	120.00	0.00	8,145.51	-8,515.66	1,320.00	
17,883.50	89.88	180.00	9,737.48	-8,365.66	120.00	0.00	8,243.79	-8,615.66	1,320.00	
17,983.50	89.88	180.00	9,737.69	-8,465.66	120.00	0.00	8,342.07	-8,715.66	1,320.00	
18,083.50	89.88	180.00	9,737.90	-8,565.66	120.00	0.00	8,440.35	-8,815.66	1,320.00	
18,183.50	89.88	180.00	9,738.11	-8,665.66	120.00	0.00	8,538.62	-8,915.66	1,320.00	
18,283.50	89.88	180.00	9,738.32	-8,765.66	120.00	0.00	8,636.90	-9,015.66	1,320.00	
18,383.50	89.88	180.00	9,738.53	-8,865.66	120.00	0.00	8,735.18	-9,115.66	1,320.00	
18,483.50	89.88	180.00	9,738.74	-8,965.66	120.00	0.00	8,833.46	-9,215.66	1,320.00	
18,583.50	89.88	180.00	9,738.95	-9,065.66	120.00	0.00	8,931.74	-9,315.66	1,320.00	
18,683.50	89.88	180.00	9,739.16	-9,165.66	120.00	0.00	9,030.01	-9,415.66	1,320.00	
18,783.50	89.88	180.00	9,739.37	-9,265.66	120.00	0.00	9,128.29	-9,515.66	1,320.00	
18,883.50	89.88	180.00	9,739.58	-9,365.66	120.00	0.00	9,226.57	-9,615.66	1,320.00	
18,983.50	89.88	180.00	9,739.79	-9,465.66	120.00	0.00	9,324.85	-9,715.66	1,320.00	
19,083.50	89.88	180.00	9,740.00	-9,565.66	120.00	0.00	9,423.13	-9,815.66	1,320.00	
19,183.50	89.88	180.00	9,740.21	-9,665.66	120.00	0.00	9,521.40	-9,915.66	1,320.00	
19,283.50	89.88	180.00	9,740.42	-9,765.66	120.00	0.00	9,619.68	-10,015.66	1,320.00	
19,383.50	89.88	180.00	9,740.63	-9,865.66	120.00	0.00	9,717.96	-10,115.66	1,320.00	
19,483.50	89.88	180.00	9,740.84	-9,965.66	120.00	0.00	9,816.24	-10,215.66	1,320.00	
19,575.25	**89.88**	**180.00**	**9,741.03**	**-10,057.41**	**120.00**	**0.00**	**9,906.41**	**-10,307.41**	**1,320.00**	**End Lateral**
										9,591.75

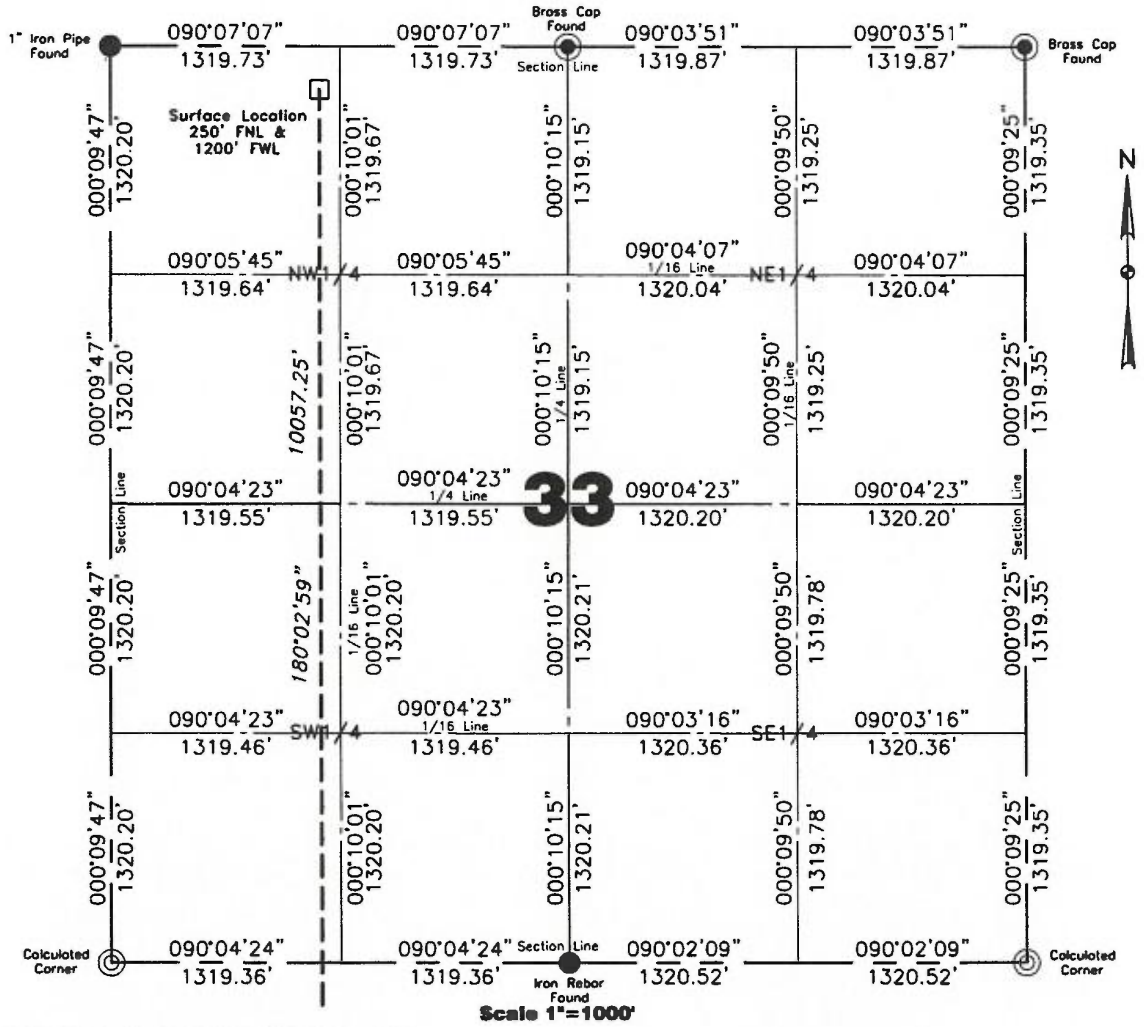
HORIZONTAL SECTION PLAT

Slawson Exploration Company, Inc.
1675 Broadway, Suite 1600 Denver, Colorado 80202

Lunker Federal 2-33-4H

250 feet from the north line and 1200 feet from the west line (surface location)
Section 33, T. 152 N., R. 91 W., 5th P.M.
250 feet from the south line and 1200 feet from the west line (bottom location)
Section 4, T. 151 N., R. 91 W., 5th P.M.
Mountrail County, North Dakota
Surface owner @ well site – Frances & Dorothy Ventsch Etal

Latitude 47°56'53.65" North; Longitude 102°20'19.68" West (surface location)
Latitude 47°55'14.42" North; Longitude 102°20'19.81" West (bottom hole location)
[Derived from OPUS Solution NAD-83(CORS96)]



I, Myron J. Kadrmas, Professional Land Surveyor, N.D. No. 3758, do hereby certify that the survey plat shown hereon was made by me, or under my direction, from notes made in the field, and the same is true and correct to the best of my knowledge and belief.

All corners shown on this plat were found in the field during Slawson Exploration Company, Inc. Lunker Federal 2-33-4H oil well survey on January 28, 2011. Distances to all others are calculated. All azimuths are based on the north line of the northeast quarter Section 33, being on an azimuth of 090°03'51".

MYRON J. KADRMAS
REGISTERED
LAND
SURVEYOR
L.S. 3758
2-10-11
NORTH DAKOTA
DATE

Surveyed By	Field Book
B. Weber	OW-242
Computed & Drawn By	Project No.
B. Chism	3711148

Kadrmas Lee & Jackson
Engineers Surveyors Planners

Feb 09, 2011 - 10:56am - J:\oilfield\Slawson\3711148\Codd\EP\3711148BAS01.DWG

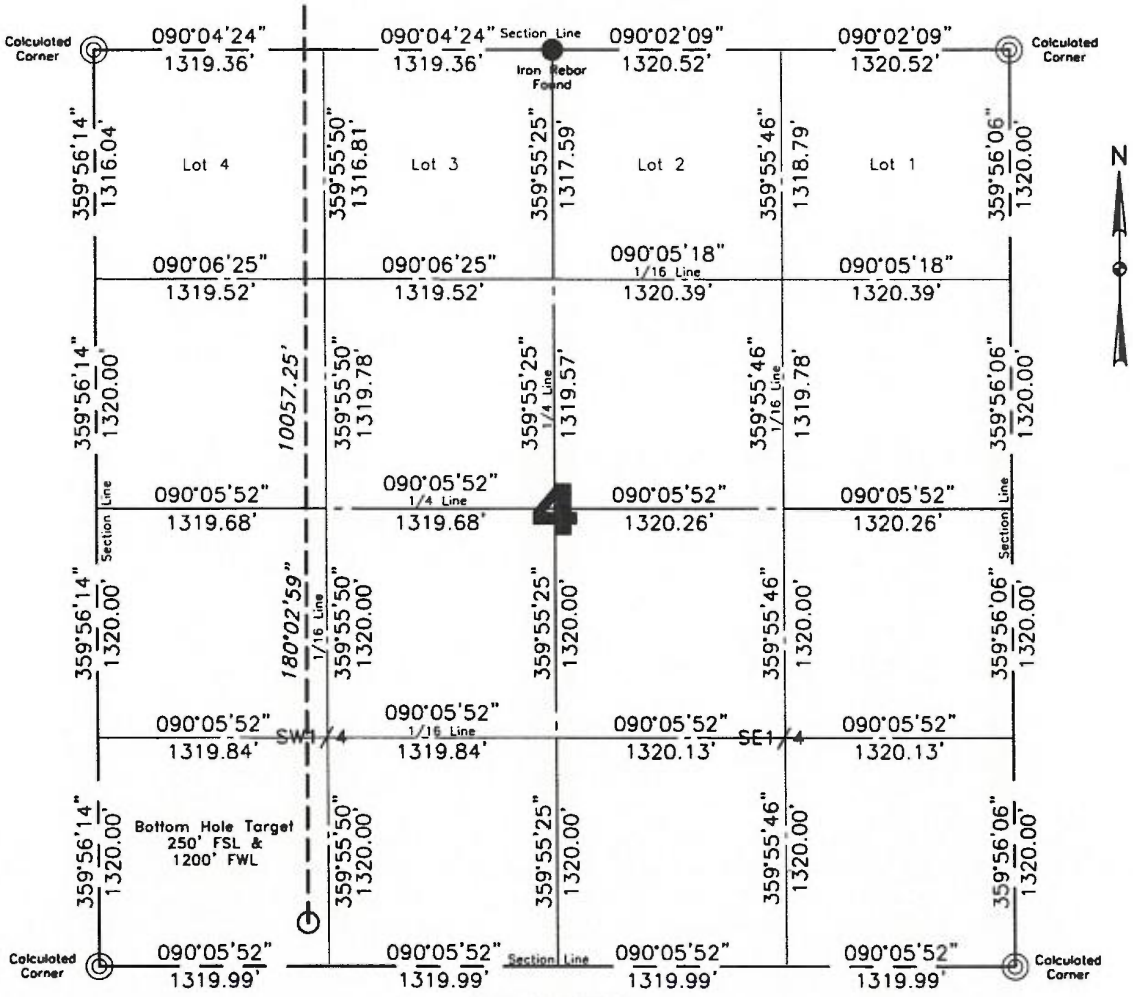
HORIZONTAL SECTION PLAT

Slawson Exploration Company, Inc.
1675 Broadway, Suite 1600 Denver, Colorado 80202

Lunker Federal 2-33-4H

250 feet from the north line and 1200 feet from the west line (surface location)
Section 33, T. 152 N., R. 91 W., 5th P.M.
250 feet from the south line and 1200 feet from the west line (bottom location)
Section 4, T. 151 N., R. 91 W., 5th P.M.
Mountrail County, North Dakota
Surface owner @ well site – Frances & Dorothy Ventsch Etal

Latitude 47°56'53.65" North; Longitude 102°20'19.68" West (surface location)
Latitude 47°55'14.42" North; Longitude 102°20'19.81" West (bottom hole location)
[Derived from OPUS Solution NAD-83(CORS96)]



Scale 1"=1000'

Confidentiality Notice: The information contained on this plat is legally privileged and confidential information intended only for the use of recipients. If you are not the intended recipients, you are hereby notified that any use, dissemination, distribution or copying of this information is strictly prohibited.

I, Myron J. Kadrmas, Professional Land Surveyor, N.D. No. 3758, do hereby certify that the survey plat shown hereon was made by me, or under my direction, from notes made in the field, and the same is true and correct to the best of my knowledge and belief.

All corners shown on this plat were found in the field during Slawson Exploration Company, Inc. Lunker Federal 2-33-4H oil well survey on January 28, 2011. Distances to all others are calculated. All azimuths are based on the north line of the northeast quarter Section 33, being on an azimuth of 090°03'51".

MYRON J. KADRMAS REGISTERED LAND SURVEYOR L.S. 3758 NORTH DAKOTA
2-10-11
DATE

Surveyed By	Field Book
B. Weber	OW-242
Computed & Drawn By	Project No.
B. Chism	3711148

Kadrmas Lee & Jackson
Engineers Surveyors Planners

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SECI_CWA308-0115

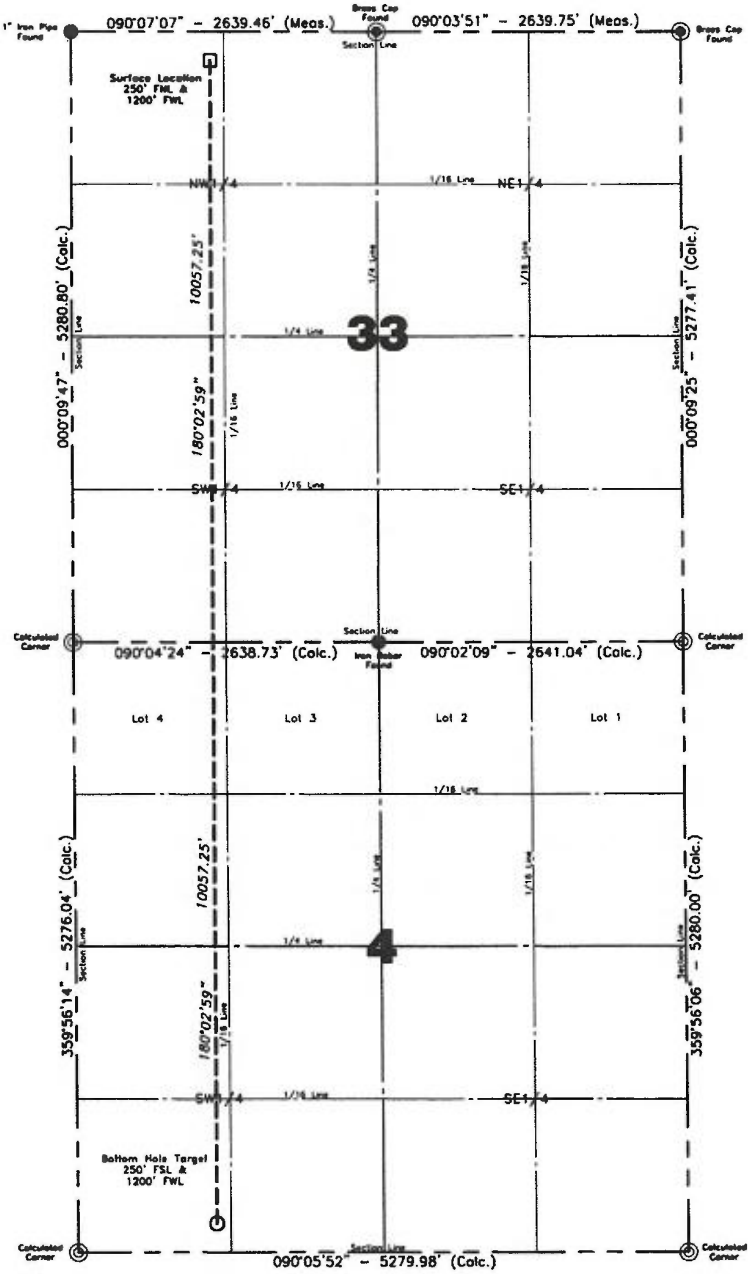
BOTTOM HOLE LOCATION PLAT

Slawson Exploration Company, Inc.
1675 Broadway, Suite 1600 Denver, Colorado 80202

Lunker Federal 2-33-4H

250 feet from the north line and 1200 feet from the west line (surface location)
Section 33, T. 152 N., R. 91 W., 5th P.M.
250 feet from the south line and 1200 feet from the west line (bottom location)
Section 4, T. 151 N., R. 91 W., 5th P.M.
Mountrail County, North Dakota
Surface owner @ well site – Frances & Dorothy Ventsch Etal

Latitude 47°56'53.65" North; Longitude 102°20'19.68" West (surface location)
Latitude 47°55'14.42" North; Longitude 102°20'19.81" West (bottom hole location)
[Derived from OPUS Solution NAD-83(CORS96)]



N

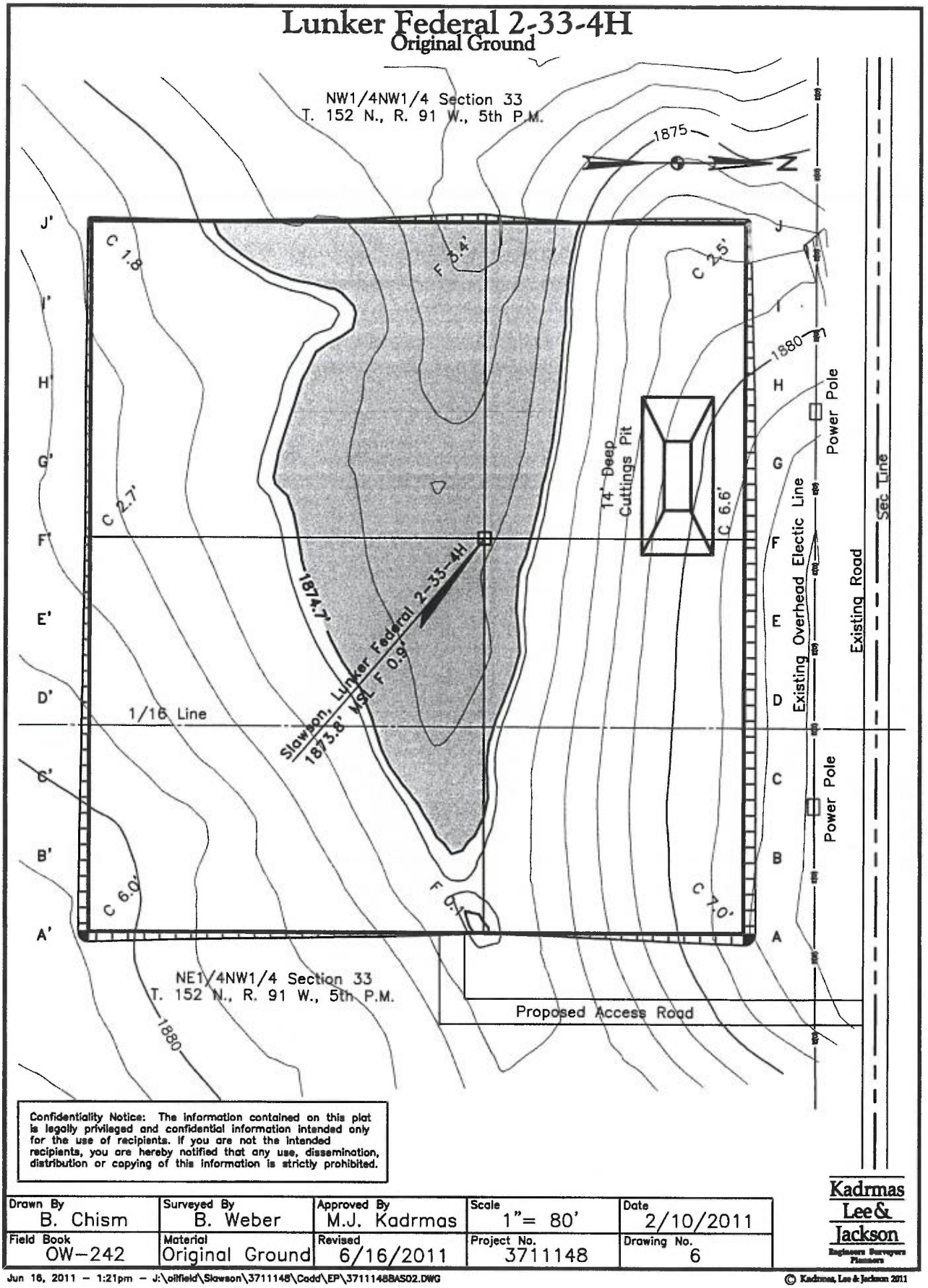
Scale 1"=1500'

Computed & Drawn By	Surveyed By	Approved By	Scale	Date
B. Chism	B. Weber	M.J. Kadrmas	1"=1500'	2/9/2011
Field Book	**Material**	**Revised**	**Project No.**	**Drawing No.**
OW-242	B.H. Layout	–	3711148	4

Kadrmas Lee & Jackson
Engineers Surveyors Planners

Feb 09, 2011 – 10:57am – J:\oilfield\Slawson\3711148\Cadd\EP\3711148BAS01.DWG

Lunker Federal 2-33-4H
Original Ground



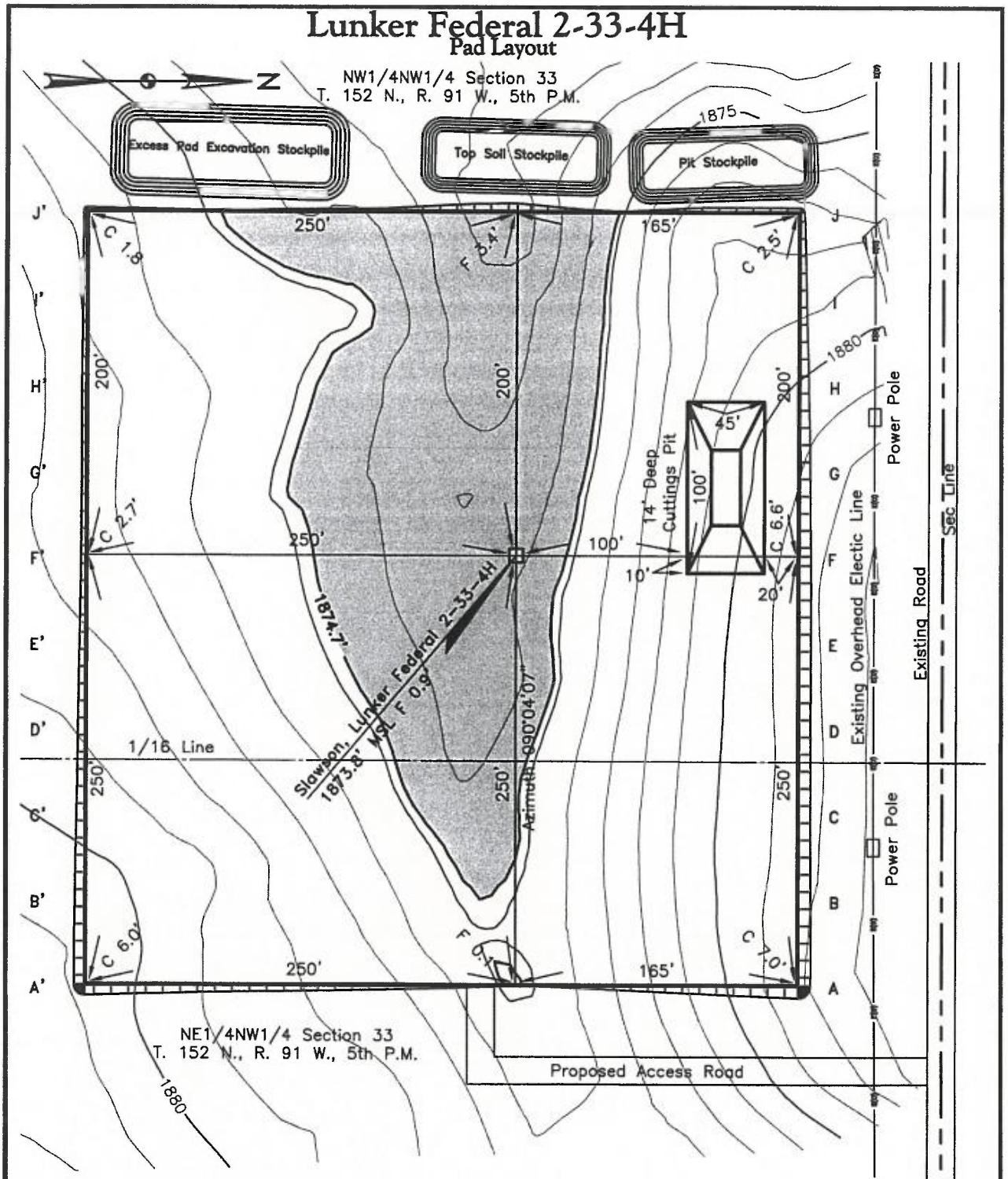
Drawn By	Surveyed By	Approved By	Scale	Date
B. Chism	B. Weber	M.J. Kadrmas	1"= 80'	2/10/2011
Field Book	**Material**	**Revised**	**Project No.**	**Drawing No.**
OW-242	Original Ground	6/16/2011	3711148	6

Kadrmas Lee & Jackson
Engineers Surveyors Planners

Jun 16, 2011 - 1:21pm - J:\oilfield\Slawson\3711148\Cadd\EP\3711148BAS02.DWG

Lunker Federal 2-33-4H

Pad Layout

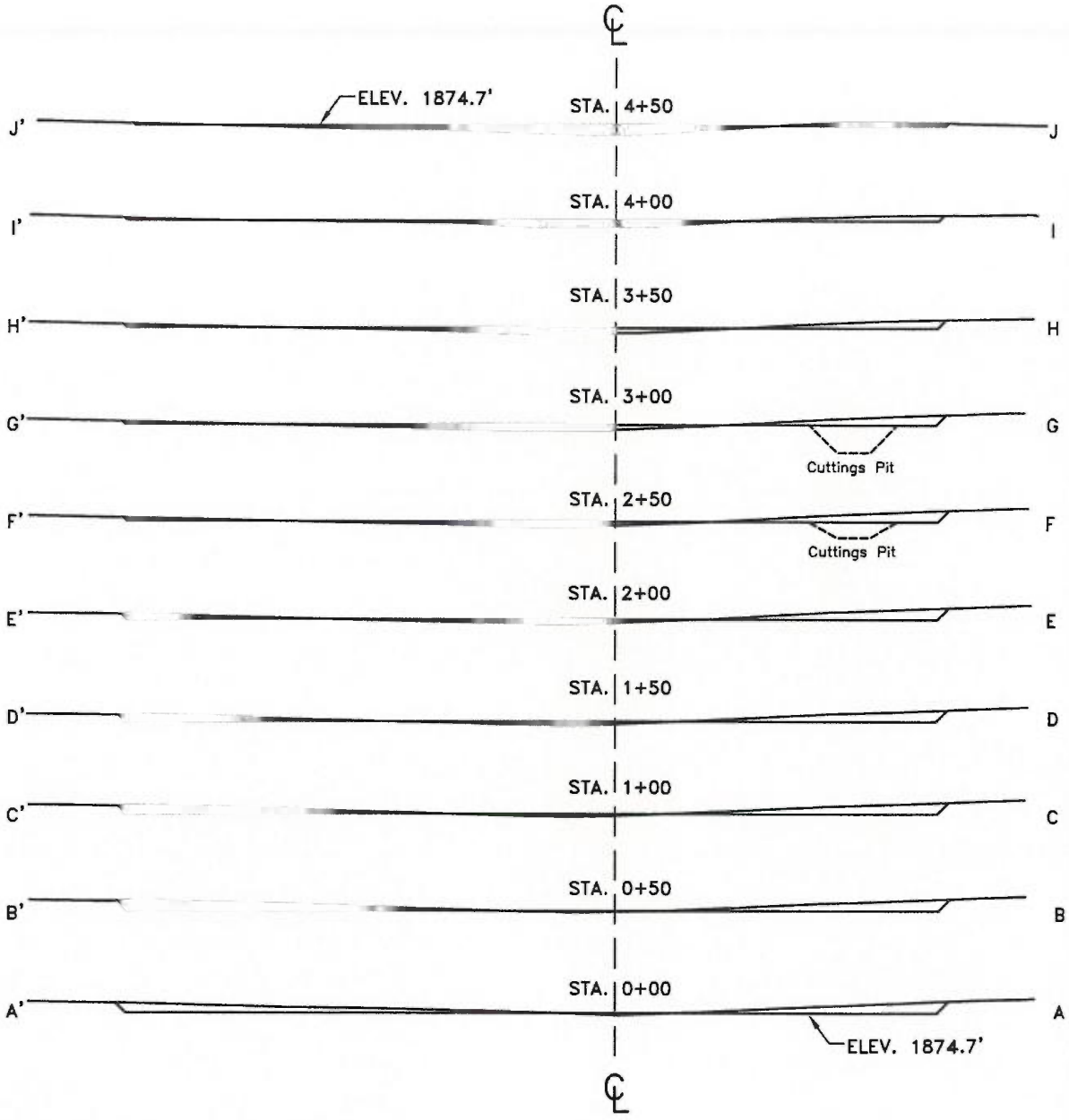


Drawn By	Surveyed By	Approved By	Scale	Date
B. Chism	B. Weber	M.J. Kadrmas	1"= 80'	2/10/2011
Field Book	**Material**	**Revised**	**Project No.**	**Drawing No.**
OW-242	Pad Layout	6/16/2011	3711148	6

Kadrmas Lee & Jackson
Engineers Surveyors Planners

Jun 16, 2011 - 1:21pm - J:\oilfield\Slawson\3711148\Cadd\EP\3711148BAS02.DWG

Lunker Federal 2-33-4H
Cross Sections



Drawn By	Surveyed By	Approved By	Scale	Date
B. Chism	B. Weber	M.J. Kadrmas	1"= 80'	2/10/2011
Field Book	**Material**	**Revised**	**Project No.**	**Drawing No.**
OW-242	Cross Sections	6/16/2011	3711148	7

Kadrmas Lee & Jackson
Engineers Surveyors Planners

Jun 16, 2011 - 1:21pm - J:\oilfield\Slawson\3711148\Cadd\EP\3711148BAS02.DWG

Slawson Exploration Company, Inc.
Lunker Federal 2-33-4H
Section 33, T 152 N, R 91 W, 5th P.M.
Mountrail County, North Dakota

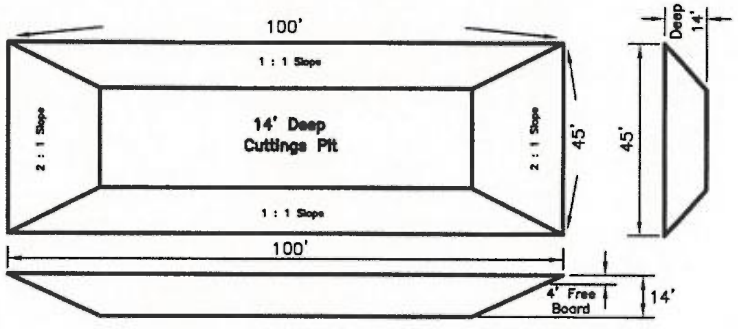
Well Site Elevation	1873.8' MSL
Well Pad Elevation	1874.7' MSL

Excavation	14,170 C.Y.
Plus Pit	1,160 C.Y.
	15,330 C.Y.
Embankment	1,605 C.Y.
Plus Shrinkage (+30%)	480 C.Y.
	2,085 C.Y.
Stockpile Pit	1,160 C.Y.
Stockpile Top Soil (6")	3,575 C.Y.
Production Rehabilitation	0 C.Y.
Road Embankment & Stockpile from Pad	8,510 C.Y.
Disturbed Area From Pad	4.43 Acres

NOTE :
All cut end slopes are designed at 1:1 slopes &
All fill end slopes are designed at 1 1/2:1 slopes

Well Site Location

250' FNL
1200' FWL



Drawn By	Surveyed By	Approved By	Scale	Date
B. Chism	B. Weber	M.J. Kadrmas	None	2/10/2011
Field Book	**Material**	**Revised**	**Project No.**	**Drawing No.**
OW-242	Quantities	6/16/2011	3711148	5

Kadrmas Lee & Jackson
Engineers Surveyors Planners

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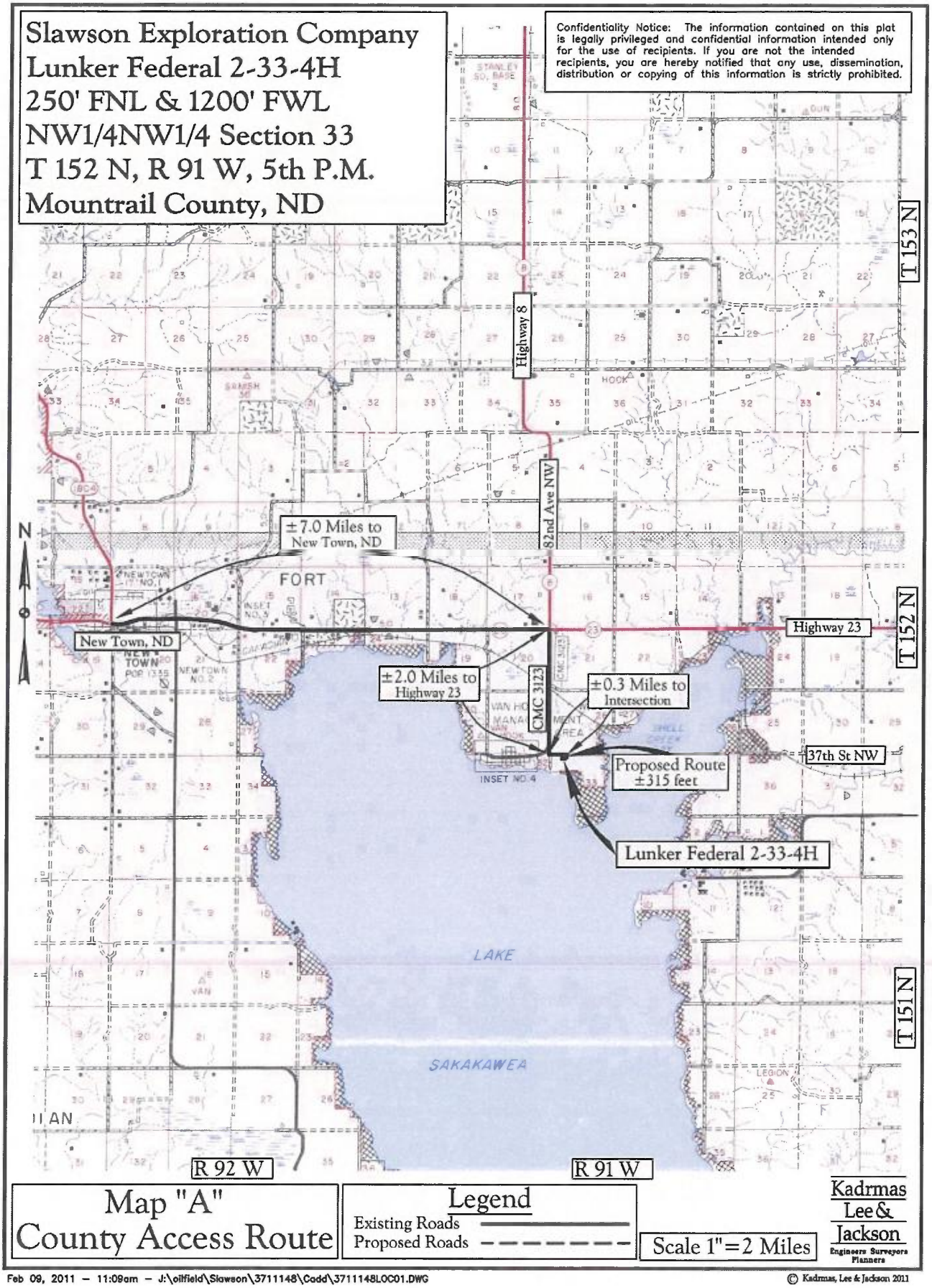
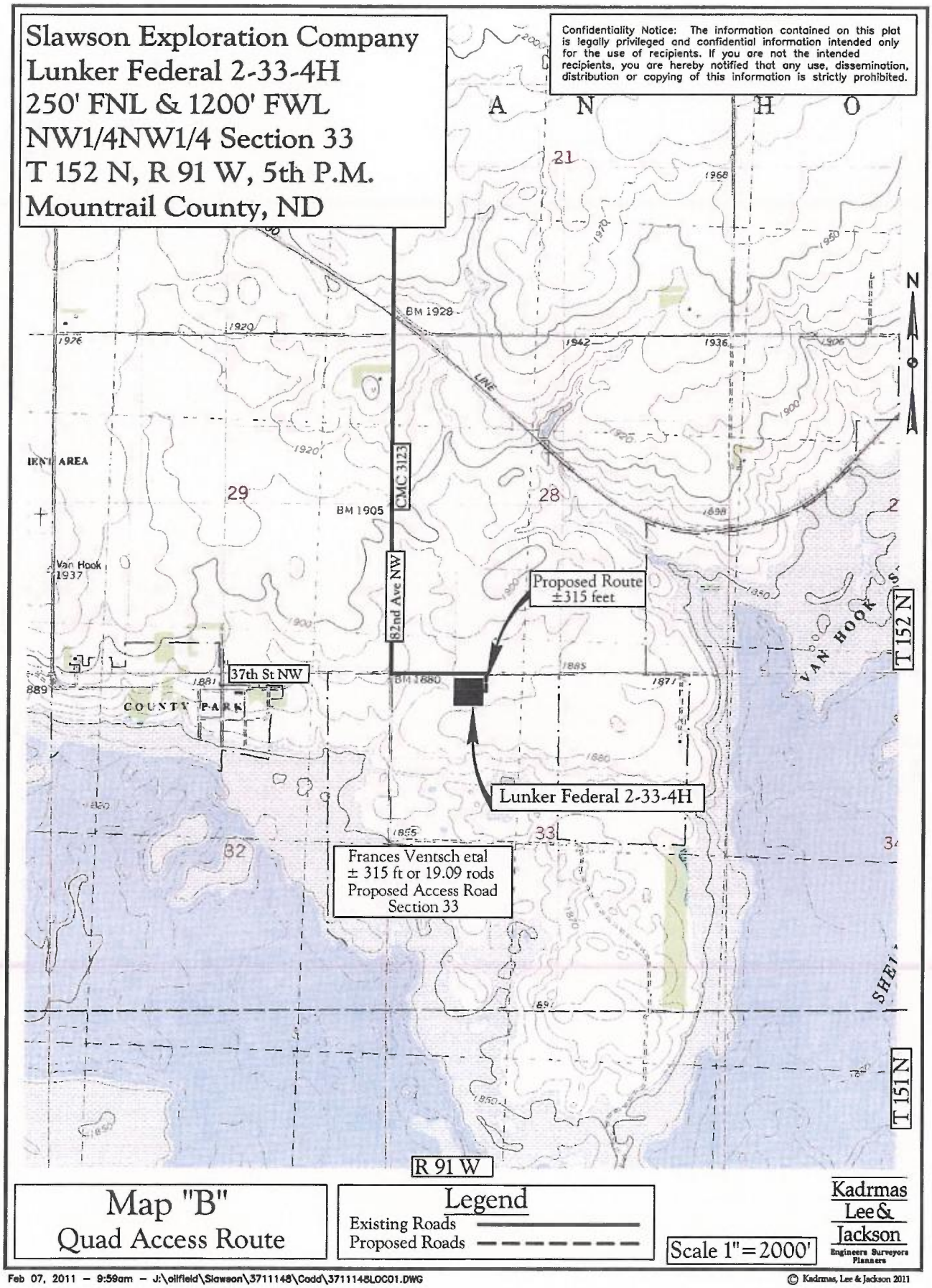


SECI_CWA308-0121



SECI_CWA308-0122

SLAWSON
exploration company, inc.

Grassroots Single Lateral Horizontal Middle Bakken Well
1280 Acre Spacing

DRILLING PROCEDURE

Operator:

Slawson Exploration Company, Inc.
1675 Broadway, Suite 1600, Denver, Colorado 80202-4714
Telephone - 303-592-8880
Fax 303-592-8881

Contacts-	Todd Slawson	COO	303-592-8882
	Matt Houston	Op Mgr	720-897-8759
	Mark McCallister	Op Eng.	720-897-8758
	Ray Gorka	Environ. Analyst	720-259-6402
	Bob Bogle	Geologist	720-897-8756

Emergency or problems or weekends, notify:
Ned Shiflett – Home 303-674-8313 or Cell 303-570-1903.
Todd Slawson – Home 303-753-6967 or Cell 303-478-3290.

Daily Reports:

Daily reports should be e-mailed each morning by 8:00 AM MST to the Email distribution provided by SECI.

Invoices:

All field invoices to have company field representative's signature.
Slawson Exploration Company, Inc.
1675 Broadway, Suite 1600, Denver, Colorado 80202-4714
Attention: Mark McCallister
Telephone – 720-897-8758

Casing Program:

Surface Casing:
9 5/8'' 36# K55 ST&C casing.

Production Casing:

Set 7" a minimum of 200' FSL & 500' FEL.
Special drift 32# to a minimum of 6".
Set 32# 150' above and below the Salt Sections (only Charles in this area).
Design may change depending upon geology encountered.

Liners:
4-1/2" 11.6# P-110 BTC with 34 packers, 34 sliding sleeves (750' of tools) spaced evenly through out the open hole and a liner hanger with pack off. The liner will not be cemented

Special Instructions:

ALWAYS stay on established lease roads.
No H_2S Safety Equipment Required
Drill the Upper Bakken Shale itself on the lateral.
Do not drill closer than 500' FEL & FWL, 200' FNL & FSL.

Drilling Procedure:

1. **Build Location. Move in Drilling Rig.**
   - Build and prepare location 450' X 550' with 40' X 150' X 14' deep pit.
   - Set conductor pipe to $60'^{+/-}$ (KB).
   - Drill mouse and rat hole to rig specifications.
   - Drill cellar to minimum 4' and line w/ corrugated ring.

- MIRU drilling rig.
- Construct a Well Sign with the following information:
  - Well Name
  - Slawson Exploration Company
  - API#
  - NDIC File Number:
  - Qtr-Qtr , Section , Township, Range
  - For Emergencies call: 303-592-8880 or 303-748-1602 or 512-944-5528

2. **Spud Well. Set and Cement Surface Casing.**
   - Spud well.
   - Drill 13½" surface hole surveying every 300' (Maximum drift: 1°) to 30' short of TD. Perform Wiper Trip to Bit. Lay down 8" Drill Collars. Return to Bottom. Drill last 30' to Projected TD. Circulate hole clean.
   - Break circulation and circulate hole clean, cement surface casing in place. Use 60% excess.

3. **Install Casing Head. NU BOP and Test.**
   - Rough Cut casing and lay down excess. Final cut casing placing the top of the casing head is at ground level.
   - Weld on 9-5/8" SOW X 11" X 5M C-22 wellhead.
   - Nipple Up BOP's, Third party test BOP's as per MMS regulations. Install wear bushing. Clean mud tanks and fill w/ invert mud.

4. **Drill Vertical hole to Kick Off Point.**
   - PU SEC FX65D or equivalent bit, 1.5° adjustable high torque mud motor, 6½" monel drill collar, hang off sub, SWD, 15 6-¾" drill collars and 3 jts of 4-1/2" HeviWate. TIH.
   - Drill to 8-3/4" hole to Kibbey Lime and TOH for a new bit; SEC FX65D. TIH.
   - Drill 8-3/4" hole to Kick off Point. KOP depth may change depending on geology encountered. Pick up 30 joints 4-1/2" Hevi Wate Drill Pipe to drill the curve before reaching KOP.
   - Install Geologist and Mud Loggers to catch the top of the Charles.
   - Unless a waiver is given, run open hole logs as follows: Triple Combo (run minimum, 20% of loggers TD), induction to the surface casing and GR to the surface.
   -

5. **Build Curve and drill to 7" Casing Point.**
   - Lay Down Monel Drill Collar.
   - PU a SEC FXD55M bit, a 2.38° fixed bend BiCo motor with no kick pad and TIH.
   - **Build the curve at 12°/100' and land the wellbore at 87° just above the Upper Bakken Shale.**
   - Drill past the hard lines at 660' from the sections lines to run 7" casing.
   - Condition hole for casing, lay down drill string and directional tools, break kelly and remove wear bushing.

6. **Run and Cement 7" Casing.**
   - Run 7" Intermediate Casing with design as per geology encountered using a float shoe, 2 shoe joints and a float collar. **Run 5 joints of 32# on top of 7" casing.**
   - 7" 32# P-110 to be run 150' above and below all salt sections. The 32# casing to be special drifted to 6" ID.
   - Use floating SPIRAL STANDOFF BANDS on every joint in the horizontal section and through the curve to KOP.
   - Place blank pipe from the KOP up to the base of the 32#. Place a floating SPIRAL STANDOFF BANDS on every 32# casing joint through the salt sections.
   - Use blank pipe up to the base of the Dakota (450' below the top of the Dakota).
   - Place floating SPIRAL STANDOFF BANDS on every other joint to 50' above the top of the Dakota.
   - Cement 7" Casing in place using 9" Hole Size for Cement Calculations and 30% excess due to no Caliper Logs. Single stage cement. Displace plug to Float Collar (do not over displace plug more than volume of 2 shoe joints).

7. CBL Log

- The CBL will be run during the completion operations

8. Prep to Drill Lateral

- Change out Pipe Rams on BOP to accommodate 4" drill pipe. Retest BOP's.
- Make up 6" SRC FX64 or equivalent and Lateral Assembly—scribe and surface Test. **PU a Hard Rock Solutions (Jim Isenhour) eccentric reamer.** TIH picking up enough XT-39 to reach from the KOP to TD and 4", 14#, S135, Full Hole for the vertical portion of the hole
- TIH filling pipe every 40 stands.
- Drill out cement, float equipment and begin drilling the lateral.

9. Drill Lateral

- Target the **Upper Bakken Shale** formation.
- **Stay in target zone using Gamma Ray as guide.**
- POH w/ lateral BHA and lay down.

10. Run 4-1/2" Liner

- PU and space Thirty Six (36) OD Packers Plus hydraulic packers and Thirty Six (36) Frac Sleeves (800' of tools) spaced at 285' intervals evenly throughout the open hole. PU Liner Top Assy. which includes Liner Hanger Packer and tie back extension to be placed at the KOP (see Packer Plus recommendation).
- **Place the top packer 30' to 60' above the 7" casing shoe**. Make sure and confirm the top packer is a casing packer.
- Displace the invert mud from the open hole with Brine water.
- Set liner hanger.
- Pressure test the annulus and liner top at this time.
- Set packers.
- Release running tool from Liner Top Packer.

11. Rig Down. Move Out.

- Displace the invert mud from the 7" casing.
- Lay down Drill String and clean pits.
- ND BOP & NU 10,000# tubing head. **Paint the top flange on the casing head Green**.
- Secure well, move off Drilling Rig.

12. Stimulate the Well and Production Tubing

- Build tank battery. Set Anchors fill and heat the water in the frac tanks if necessary.
- NU and test the tree saver.
- Stimulate the well as per the recommendation and flow the well back up 7" casing.
- MOL & RU a service unit and snubbing unit.
- PU a mule shoed joint of 2-7/8", 6.5#, L-80 tubing.
- PU a mechanical SN and TIH, let well flow until rods are needed.
- MIRU service unit, TOOH tubing. Replace mule shoe with bull plugged joint and echo gas anchor, place mech. SN two jts above gas anchor. PU a 7" x 2-7/8" TAC and place just below SN. RIH tubing.
- Land tubing with the bottom of the mud anchor in the deepest vertical section of the hole.
- Set TAC with a minimum of 20,000# tension.
- ND BOP & NU WH with B-1 section.
- Run 2" pump and rods as per design. Long stroke pump to 500#. Place well on production.